# Making Informal Learning Legible:
# Alternative Digital Credentials for College Access

by

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## Dedication

This dissertation is dedicated to the people who have been key to its completion. To my beautiful and kind wife, thank you for your unwavering support and compassion over what seems like a lifetime. This accomplishment is as much yours as it is mine.

To my mother, father, and Grandma Ruth, thank you for all that you have taught me throughout my life like multiplication, the value of hard work, and how to start a ninety-year-old tractor. You know, the important things in life.

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## Abstract

Higher education institutions have long strived to recruit and admit cohorts of college-ready students who will not only succeed but thrive in their institutions. Over time, the infrastructure and processes surrounding college admission have evolved to reflect the evolving goals of colleges. More recently colleges have worked to admit classes of students that reflect the racial and socioeconomic diversity of the population of the United States, but for a range of reasons have found this goal challenging. To achieve this goal, many institutions have broadened their definitions of college readiness to include achievements in both formal, school-based learning and informal, out-of-school learning, an admissions process known as holistic review. This issue can be viewed as an information problem, as colleges struggle to use the existing information infrastructure of grade-point averages (GPAs), test scores, and the Common Application to identify promising students.

This study explores the thesis that an alternative digital credentialing system can be used to make applicants' informal learning activities more legible to college admissions personnel, thereby helping to broaden access to college. The findings of this study indicate that this thesis is not correct, or at least correct in only limited circumstances. Prior research has suggested that alternative digital credentials might increase the legibility of informal learning outcomes for college admissions, yet questions remain about how they might be used in practice. This dissertation employs semi-structured interviews with twelve college admissions officers from different types of colleges and universities to understand how they make sense of learning

outside of school using the admissions tools currently available to them such as personal essays, letters of recommendation, and information about students' extracurricular engagement. These interviews also explored opportunities for addressing some of these challenges with alternative digital credentials.

Findings suggest that college admissions officers look for specific types of signals when reviewing information about learning outside of school such as the prestige of an applicant's activities, evidence of career exploration, and the applicant's ability to weave a narrative of their accomplishments across the different materials of the application file. Improving the legibility of informal learning through alternative digital credentials will require establishing agreed upon taxonomies for informal learning outcomes and information systems for contextualizing applicants' opportunities to engage in meaningful learning experiences outside of school. The main contributions of this study include insights into the way an institution's selectivity is likely to shape their use of alternative digital credentials, the types of signals alternative digital credentials should amplify in order to be more useful in the admissions process, and recommendations for future directions for the design of alternative digital credentialing systems for college admissions.

# Chapter 1

# Introduction

In June 2023 the Supreme Court of the United States (SCOTUS) ruled that admissions policies at Harvard University and the University of North Carolina-Chapel Hill violated the Equal Protection clause of the 14th amendment and Title VI of the Civil Rights act of 1964 (Students for Fair Admission, Inc. v. President and Fellows of Harvard College, 2022; SFFA v. Harvard). The Court held that admissions policies at both institutions discriminated against Asian Americans applicants. The court sided with SFFA's argument that the use of race-conscious admissions procedures (affirmative action) gave unlawful preference to racial minorities and held Asian American applicants to a different standard of admission. The court's decision went against decades of precedent that had affirmed the value of affirmative action policies as one solution to the systemic exclusion of racially marginalized groups from educational opportunities (Espenshade & Walton Radford, 2009; Fleming, Swinton, & Gill, 1978; Feingold, 2023).

For college admissions offices across the country the SCOTUS decision no doubt raised questions and concerns about how they might maintain their commitment to admitting classes that are representative of the racial and cultural diversity of the United States. Prospective students themselves most likely questioned whether and how to present themselves and discuss their identity in their applications. To bring clarity to the confusion of admissions offices, the Department of Education (DOE) released guidance on how it believed admissions could

maintain their commitment to equitable access. The report emphasized the practice of holistic review, an approach to evaluating applications in light of both formal academic achievement within school and on standardized tests as well as informal, nonacademic learning occurring outside of school typically communicated through student essays, letters of recommendation, and information about extracurricular engagement. Most importantly, holistic review emphasizes contextualizing the experiences and accomplishments of applicants in light of the opportunities available to them. This allows admissions offices to move beyond formulaic decisions based on grades and test scores to also consider additional definitions of merit (Coleman & Keith, 2018). Admissions officers, also called application readers in this study, play a vital role in evaluating the educational and broader life experiences of college applicants. As gatekeepers their decisions shape inequality in the United States by deciding who does and does not merit access to higher education.

This dissertation focuses on how admissions officers use information about informal learning as part of their holistic review of college applications. I use the term informal learning to distinguish it from formal, school-based learning. Studies of holistic review have found college admissions officers (application readers) utilizing information about learning experiences that occur outside of the classroom, after school hours, and across different learning contexts to understand applicants' ability to adjust to the requirements of college life (Kyllonen, 2012; Coleman & Keith, 2018; Hossler, et al., 2019). Unfortunately, while the recommendations were well intentioned, research on the use of information about aspects and outcomes of informal learning and holistic review have demonstrated a relationship between placing an increased emphasis on nonacademic factors and decreased representation of students of low socioeconomic background at colleges and universities across the United States (Rosinger, Ford, & Choi, 2021;

Park, et al., 2023). Despite these findings, the recommendations made in the report were not ill-advised. Longitudinal studies of contextualized admissions decisions at one university found that contextualized high-school GPAs (applicant's GPA relative to high school median GPA) positively associate with first-year college GPA, retention to the second year of college, and persistence to graduation while demonstrating fewer group differences than what occurs with the use of "raw" high-school GPA (Bastedo, Umbricht, Bausch, Byun, & Bai, 2023). These findings suggest that expanding the criteria used to admit students can expand access to higher education for those most often excluded, but more research is needed to understand how information about informal learning is used to make admissions decisions so that we can develop more effective tools for provisioning this information to admissions officers.

The purpose of the study presented in this dissertation is to explore how the legibility of informal learning experiences and outcomes communicated through college applicant materials can be improved using innovative tools known as alternative digital credentials. The study also contributes to ongoing efforts to use alternative digital credentials to strengthen pathways from youth-focused out-of-school education programs to higher education (Fishman, Teasley, & Cederquist, 2018; Pitt et al., 2018; Martin, Guitierrez, & Muldoon, 2020; Guitierrez & Martin, 2021).

In the remainder of this introduction, I first briefly define informal learning and alternative digital credentials. I then discuss their relevance to the history of college admissions through a descriptive and historical analysis of the different tools and materials that make up the existing college admissions information infrastructure. I also define what is meant by "legibility" within the context of this study. I conclude the chapter by revisiting existing efforts to use alternative digital credentialing to support college access. I then propose the two research

questions that guide this dissertation, discuss the significance of the study, and outline the remaining chapters.

### 1.1 Background: Alternative digital credentialing and the college admissions infrastructure

In this study, informal learning is considered to be learning that is interest-driven and social, and where assessment is formative and used to further the activity rather than summative or done for purposes of accountability. Informal learning typically occurs outside the formal structures of schooling but may also occur within schools (Rogoff, Callanan, Gutiérrez, & Erickson, 2016). A National Research Council report on informal STEM learning also described informal learning as occurring throughout the life cycle (life-long) and occurring across multiple contexts of our lives (life-wide) including our home, school, and less-formal environments like museums and libraries. The report also described informal learning as life-deep—learning motivated by "beliefs, ideologies, and values" (NRC, 2009, p. 28). Alternative digital credentials allow individuals to collect evidence and detailed information about their learning across different learning environments, including formal schooling, work, the home, or other informal places of learning such as museums and libraries (Goger, et al., 2022).

The term alternative digital credentialing refers to a suite of Web-enabled and interoperable credentialing tools designed to support informal learning. Alternative digital credentials function like paper credentials in that both are records of an individual's learning. However, alternative digital credentials are designed to communicate information about an individual's learning in rich detail and to be shareable on social networking sites (Knight, 2010). Alternative digital credentials include tools such as digital badges, microcredentials (short-term self-paced learning programs often offered online), credential issuing platforms, comprehensive learning records (CLR) (a verifiable digital record similar to an e-portfolio and academic

transcript), tools for curating and sharing digital credentials such as digital wallets, and metadata frameworks and libraries (EDUCAUSE, 2019; Goger, et al., 2022; SmartResume, 2025). Collectively these and other alternative digital credentialing tools constitute what has been called the "Learn-and-Work Ecosystem" (also LER Ecosystem)—an information system designed to help individuals navigate career exploration and career advancement through incremental credentialing along guided career pathways (Zanville & Travers, 2022).

In *What Counts as Learning: Open digital badges for new opportunities*, Sheryl Grant (2014) suggests that when designing alternative digital credentialing systems, which this study intends to inform, we should start by examining the existing credentials within the space we want to innovate and ask ourselves what they say about our assumptions about learning, competence, and opportunity. In the following chapter I return to my discussion of alternative digital credentials. I discuss their origin in research on digital media and learning. I also discuss the technological affordances of alternative digital credentials that make them a potentially useful tool for college admissions. But first, I introduce the various materials of the existing college admissions infrastructure by describing the history of their emergence as tools for representing different views of college readiness.

### *1.1.1 The origins of the college admissions infrastructure*

The origin of the college admissions infrastructure in America can be traced to the final decades of the nineteenth century when the interest of business, philanthropy, and educational reformers converged on a project of mutual interest: the articulation of secondary school graduation requirements with post-secondary admissions standards. At the time, rapid industrial growth fueled the expansion of the middle class: between 1870 and 1910 the size of the middle class increased from approximately 756,000 to 5,609,000 (Brown, 1995, p. 98). Industrialization

in turn contributed to the transformation of companies into complex bureaucracies and the rise of white-collar work. As work modernized, and corporations became more specialized and geographically dispersed, employers found white-collar work required an ability to act on behalf of the company in unstructured and uncertain situations. Finding qualified white-collar workers was difficult for corporations, however. Because the work required strong written and verbal communication skills, employers increasingly turned to colleges and universities as trusted organizations known to develop these skills in their graduates (Brown, 1995). Students followed businesses into college: In the 1870s, a typical institution employed 10 faculty and enrolled 98 students. By 1890, these figures increased to 16 faculty and 157 students. By 1915, the typical institution enrolled 5,000 students (Geiger, 2011, p. 52).

The rush of students to higher education presented colleges with a problem: how to determine who is likely to succeed in college. This was not a new problem for higher education; institutions had always relied on in-house assessments for determining an applicant's college readiness (Geiger, 2015). This system worked fine for a time when students had little reason to travel a great distance for higher education. The difference in the 20th century was the railroad. Completed shortly following the Civil War, the Transcontinental Railroad made it easier for youth to travel far from home to attend higher education or find work. Because universities and colleges were now coming into increased contact with students from high schools from across the country, many of which were unfamiliar to them, the desire grew for a standard information infrastructure that would allow colleges and universities to quickly, efficiently, and reliably determine an applicant's college readiness (Salmon, 1893).

***The articulation movement.*** Efforts to articulate secondary school graduation requirements with higher education admissions standards gained traction when efforts shifted

from uncoordinated local state reforms to a national articulation project spearheaded by the National Education Association (NEA) (VanOverbeke, 2008). In 1892, the NEA established the Committee of Ten on Secondary Schools Studies. The committee consisted of representatives from elite northeastern higher education institutions and secondary schools—among secondary school representatives only one came from a public high school (VanOverbeke, 2008, p. 118). The Committee codified college readiness through a standard college prep curriculum; what people today would easily recognize as traditional high school coursework.

One of the main innovations recommended by the Committee of Ten was the requirement that students complete specific course requirements dictated by time allotment. This was the origin of the credit hour, a tool still used today to denote seat time requirements for degree completion. Standardized achievement tests for college readiness soon followed the credit hour and college prep curriculum. In 1895, the Association of Colleges and Preparatory Schools in the Middle States and Maryland formed the College Entrance Examination Board (CEEB) and charged them with creating a standardize subject tests to be used in college entrance examination. The tests aligned with the Committee of Ten's college preparatory curriculum (VanOverbeke, 2008), which itself strongly reflected the curriculum of northeastern boarding schools (Lemann, 1999); for example, by the inclusion of a standard assessment of Latin, an old holdover from the previous method of admitting students to college. The infrastructure of grades, standard college prep coursework, and standardized achievement tests meant universities could now quickly and efficiently ascertain an applicant's readiness for college with relative confidence.

***The rise of selective admissions.*** Innovation of the college admissions infrastructure did not stop with the articulation movement and CEEB achievement tests, even though the system

functioned well. It functioned so well, in fact, that by the 1920s leadership at elite universities felt too many students were attending higher education and something needed to be done to ensure that elite institutions admitted the "right" kind of student. Historians have typically framed this as a reaction to the increased number of students at Ivy League colleges with Eastern European Jewish heritage. To reduce the flow of these students into elite higher education, institutions began to change their definitions of college readiness to include aspects of an applicant's character. To gain insight into an applicant's character, institutions increasingly relied on letters of recommendation, interviews conducted by alumni, and ad hoc systems for collecting information on extracurricular achievement. These were the first instances of selective admissions and the origin of holistic review in college admissions.

Around the time that elite Ivy Schools began to focus on applicant character, some colleges and universities went further and implemented innovative aptitude tests developed from the U.S. Army Alpha test; an intelligence test adopted for personnel selection during World War I (Karabel, 2005; Kevles, 1968; Wechsler, 1977). Elite institutions found aptitude tests, specifically the SAT, particularly convenient for justifying their exclusion of Eastern European Jews from admission citing their poor performance on these tests as proof of their intellectual inferiority. In reality, historical accounts of the early adoption of standardized aptitude tests attribute the poor performance of these students to the fact that the SAT test at the time primarily assessed English vocabulary and students of Eastern European Jewish heritage were more likely to be the children of immigrants (or immigrants themselves) and therefore did not speak English as a first language. This put them at a distinct disadvantage to their Anglo-Saxon native-English speaking peers (Wechler, 1977).

### *1.1.2 The problem with the college admissions infrastructure and potential of alternative digital credentials*

The most obvious and well-documented problem with this history is the purposeful exclusion of racially minoritized populations through the use of standardized admissions criteria, a persistent problem that has been frustratingly difficult to reverse (Atkinson & Geiser, 2009). Other problems of the college admissions infrastructure come into view when the problems of other state projects of legibility and simplification are considered, as described by James Scott (1998). Projects of legibility and simplification, according to Scott, are motivated by a desire to bring order to the natural and political environment for the purposes of resource extraction whether they be natural, monetary, or human resources. Standardized measures are used to make the messiness of the world legible and thus easier to manage and extract. While often initiated for the purpose of improving the welfare of the state and its people, Scott found many of these projects often had highly detrimental consequences to the populations they were meant to help. Scott's illustrative example is the rise of scientific forestry in Prussia and Saxony in the late 18th century (Scott, 1998, pp. 14-22). In a scientifically managed forest, land is defined by the amount of lumber per square mile that it can produce. The myriad other potential uses of the land and of the trees that have become lumber are obscured in this process of simplification. As a result of the narrow focus on lumber production, entire forests within Prussia and Saxony were leveled and rows of identical trees were planted with little regard for the benefits of biodiversity to the larger ecosystem. This unfortunately resulted in ecosystem collapse, what came to be known as "forest death" (Scott, 1998)

Ultimately, when trees are seen only as lumber, the local knowledge of the forest and its importance to the people who live within it becomes overshadowed by the state's demand for

uniform products. We can apply the same logic to the articulation of high school graduation requirements with college admissions standards and materials. Lorrie Shepard (2000) has argued that the legacy of the articulation movement produced a culture of assessment in schools that is oriented more to the sorting of those who are college ready from those who are not than it is to help all students reach their full potential. The movement to modernize and standardize the American education system has succeeded in part because colleges desperately need students, students desperately need jobs, and business desperately need qualified workers (Brown, 1995; Geiger, 2015). Reducing college readiness to standardized academic measures simplified admissions and helped ensure college-ready students, but it narrowed the view of what college readiness means. Privileging school-based forms of learning and assessment in the admissions process leaves little room for the idea that learning extends beyond school walls to include both academic and nonacademic outcomes.

More recent efforts to increase participation in higher education are committed to reversing this trend through the use of alternative digital credentials to document learning in high-quality, youth-focused learning opportunities outside of school. Efforts to establish these learning experiences as steppingstones to higher education have focused on using alternative digital credentials as a way of representing and communicating the nonacademic outcomes of these programs (Fishman, Teasley, & Cederquist, 2018; Pitt et al., 2019; Martin, Guitierrez, & Muldoon, 2020). While this body of research is in the early stages of development, much has already been learned about the potential uses and obstacles to adopting alternative digital credentials in college admissions. From prior research, we understand the potential of alternative digital credentials is to provide additional evidence of students' achievements by highlighting and communicating information about learning outside of school. However, we know very little

about how alternative digital credentials would fit within the existing admissions system. The objective of the study described in this dissertation is to understand how information on informal learning is currently represented in college applications, how it is used to make admissions decisions, and how alternative digital credentials might integrate with the existing admissions processes. If we are to successfully incorporate alternative digital credentials into the college admissions infrastructure as a way of representing informal learning as a measure of college readiness, we must account for what is already there and find articulation points. That is the focus of this dissertation.

### 1.2 Purpose and research questions

As noted above, proponents of alternative digital credentials argue that they can help make informal learning more visible for a range of uses including college admissions. But to what extent is this true within the current college admissions system? The dissertation explores this question through interviews with college admissions officers, guided by two research questions:

1. How do college admissions officers utilize information about students' informal learning to make admissions decisions?
2. How might alternative digital credentials improve the legibility of informal learning in application review processes?

In Phase I of the study, I explored the application review processes of twelve college admissions officers to understand the role and significance of informal learning to their admissions decisions. In Phase II, I reinterviewed seven informants from Phase I. During these second interviews, I further developed themes that emerged from Phase I that closely align with the affordances of alternative digital credentials.

### 1.3 Significance

This dissertation project makes a number of contributions to different strands of research: I provide insight into the role and use of nonacademic factors of college success in admissions decisions, I describe how college admissions officers "read" applications to find and evaluate evidence of college readiness across the different information sources available to them and discussed how selectivity interacts with the evaluation of nonacademic factors, and I describe the significance of particular types of informal learning valued by informants in this study. This includes insight into the way in which the perceived substance of extracurricular learning experiences shapes admissions officers' perceptions of the experience's quality. Throughout the discussion I describe how alternative digital credentialing systems can support the holistic review of college readiness. I present findings detailing how application readers might use alternative digital credentials to validate and contextualize informal learning experiences and outcomes and discuss issues with using student work examples to make admissions decisions, a common affordance of alternative digital credentials often cited as one way in which alternative digital credentials might support pathways from informal learning to higher education.

# Chapter 2

# Literature Review

The context of this study is the boundary between secondary and postsecondary education, and the information infrastructure used to coordinate the college admissions process for millions of high school seniors, their high schools, and the thousands of colleges and universities across the United States every year. In this chapter, I take a closer look at the different components of the existing college admissions infrastructure. I first describe how these different components function as an information infrastructure consisting of different "boundary objects" (Bowker & Star, 2000) of college readiness used by admissions officers and prospective students to coordinate the college application process. I review the literature on three different types of college readiness factors: academic, nonacademic, and contextual (Coleman & Keith, 2018, p. 9). I then review literature that describes holistic review as an admissions process. My discussion of holistic review is followed by a review of alternative digital credentialing literature. My review focuses primarily on early conceptual work on digital badges and work that examines the potential use of alternative digital credentials for supporting pathways into higher education.

## 2.1 The boundary objects of the college admissions infrastructure

The concept of information infrastructure used in this study is taken from the work of Leigh Star and her colleagues (Bowker & Star, 2000; Star & Griesemer, 1989; Star & Ruhleder, 1996). According to Bowker and Star (2000), infrastructures consist of different *boundary objects* which are standards that are "plastic enough to adapt to local needs and constraints" yet

"robust enough to maintain a common identity across site" (p. 297). They are standards that satisfy the informational needs of different communities of practice with distinct informational needs. To illustrate this definition, Star (2010) gave the example of a road map used by both hikers and scientists: "a road map might point to a campground . . . a place of recreation. For another group, this 'same' map may follow a series of geological sites of importance, or animal habitats, for scientists" (Star, 2010, p. 602). Through its flexibility, the road map supports the work of both hikers and scientists without needing consensus on the meaning or purpose of the road map. Its purpose arises from the demands placed on a community of practice by their local context. This chapter examines the boundary objects of the college admissions infrastructure—the various admissions criteria and information sources used in college admissions—with a focus on the materials that communicate information about informal learning. It also examines alternative digital credentials as a potential boundary object for linking the worlds of informal learning networks and college admissions offices.

When used together as part of a holistic review of college applications, the various boundary objects of this infrastructure link the worlds of high schools, prospective college students, and admissions offices much like the example of the map given above: they are both robust in their meaning but flexible enough to meet the demands of different communities. Grade point average (GPA) provides a useful example. To high school administrators, GPA is used to track and communicate academic progress with students, their families, and state legislatures. GPA is also useful for ranking graduates and awarding academic honors to a select few students. For universities and colleges, GPA serves different purposes. One purpose, which I discuss in more detail below, is to predict academic performance in college. A related purpose is publishing a profile of the ideal applicant which prospective students might use to gauge their prospects of

admission to particular institutions. Collectively, high schools, higher education institutions, and prospective college students rely on GPA and the other boundary objects predictive of college success to navigate the complexity of the college admissions process and their transition into higher education. In the following sections I take a closer look at these *boundary objects*.

### *2.1.1 Academic factors of college readiness*

Because every institution is concerned with an applicant's potential to succeed academically (Camara, 2005; Sternberg, 2010; Zwick, 2017), any model of college readiness used to admit students will include methods to forecast academic performance in college. Typically, this means freshman grade point average (FGPA) or some other variation of academic success in college such as persistence to the second year. According to Camara (2005) and Zwick (2017), the most common predictors of FGPA are other measures of academic performance documented before college such as nationally normed standardized tests, high school grades, and high school coursework. In surveys, college admissions offices fairly consistently list measures of academic performance as the most important criteria considered in their admissions processes (Hossler, et al., 2019; Rosinger, Ford, & Choi, 2021).

Standardized tests like the SAT and its competitor the ACT represent a larger category of different types of tests used in the college admissions process (Camara, 2005a). The SAT is one example of the category of tests known as aptitude tests. Aptitude tests are not aligned with standardized curricula nor are they aligned with instructional objectives. Rather, they are based on models of cognition such as verbal and mathematical reasoning. The SAT has been revised many times, most recently in 2016 (Zwick, 2017). Changes have been made to both the administration of the exam and the content, generally with the intention of addressing issues of bias (Lawrence, Rigol, Van Essen, & Jackson, 2003). The ACT, on the other hand, is an example

of a subject test, much like the CEEB admissions tests discussed in the previous chapter. In 1959, researchers at the University of Iowa developed the ACT as an alternative to the SAT because they felt the SAT privileged the boarding school curricula of northeastern private schools: traditional feeder schools to the Ivy League (Lemann, 1999). Zwick (2017) notes that the primary difference with the ACT, then and now, is its close connection to instructional objectives of high school curricula, unlike the SAT. This is reflected in both the content and structure of the test: four multiple choice tests, one each for English, mathematics, reading, and science, and a timed essay. Other notable subject tests include SAT II subject tests and Advanced Placement (AP) exams.

The other academic factor used to predict academic performance in college is high school grade-point average. Sternberg (2020) describes the different reasons grade-point average is a useful tool for admitting students. The first is that high school GPA and FGPA in college are measures of the same thing: average and weighted performance in coursework and course assessments. The second advantage is that high-school GPA, through the use of one number, succienctly communicates information about the mastery of a variety of skills, including noncognitive (nonacademic) skills such as attitude, engagement, and interest (Russel & Austin, 2010; Willingham, Pollack, & Lewis, 2002, as cited in Bonner & Chen, 2019). A third advantage of high school GPA, according to Sternberg, is its universality: nearly everyone has one.

Camara (2005) and Zwick (2017) both argue that standardized tests and high school GPA are logical predictors to use if an institution defines college success as academic performance. Both high school grades and standardized tests report academic achievement quantitatively, making them particularly useful for fine-grained statistical prediction of FGPA. High school grades and test scores also modestly correlate with FGPA with each reliably explaining

approximately 35% of the variation in academic performance in college. Most importantly, their use together improves prediction; when combined into a single index they explain 46% of the variation in academic performance in college (Zwick, 2017).

While high school grades and standardized test scores have a modest correlation to academic performance in college, the explanatory power of each is complicated by a number of issues. Sternberg (2010) and Zwick (2017) provide detailed discussions of some of these problems. While described by Sternberg as an advantage of GPA, the multidimensional nature of grades may actually complicate their interpretation: how does one determine the different skills represented by the grade and the contribution each makes to the overall grade? Additionally, grading practices have been shown to vary between teachers, calling their reliability into question. In their review of research on the reliability of grading dating back to the 19th century, Brookhart and Guskey (2019) consistently found studies that demonstrated significant variation in how teachers, even those within the same school, grade the same assignments. Deciphering the meaning of grades also requires considering the grading conventions associated with specific academic disciplines as well as the local grading conventions and rigor of particular high schools (Sternberg, 2010). Finally, while the grade-point average is a useful tool for drawing "objective" distinctions between applicants, the utility of grade point average for making these distinctions decreases as the range of grade point averages used to develop the predictive model shrinks, what is known as restriction of range (Zwick, 2017, pp. 89-90). Zwick uses the correlation of height with "basketball performance" when basketball performance is defined as the average number of points scored by NBA basketball players. Given the advantage height provides in basketball, it may seem logical to use it as a metric for organizing a team. However, scoring points is not the only way in which NBA players and teams win games. Some players are better

rebounders than scorers. Some are better at setting up assists. Both factors contribute to the number of points scored by the team. The point Zwick is making is if teams want to score points, they need to look beyond height to consider other attributes that make players great and teams successful. This perhaps explains why nonacademic factors tend to be emphasized heavily in selective admissions processes where the vast majority of applicants meet minimum (but still high) academic requirements for admission (Hossler, et al., 2019). If the institution's definition of success is limited to academic performance measures, the students will likely be academically successful but may lack other vital attributes that contribute to college success such as leadership, problem solving, and self-management.

Sternberg argues that class rank can reveal local grading practices (Sternberg, 2010) and utilizing class rank to admit students has been shown to increase the enrollment of low-SES and minority students at selective institution and is a policy that has withstood multiple legal challenges, such as in the Texas Supreme Court Case *Fisher v. University of Texas at Austin* (Zwick, 2017, p. 104). Zwick argues that because rank obscures factors such as the rigor of the coursework, it introduces the risk of overpredicting the college readiness of high achieving students from schools lacking a rigorous curriculum, typically schools with low-socioeconomic status (SES). Zwick supports this argument with reference to longitudinal research that looked at the high school math and science grades of students at both high- and low-SES high schools and compared these grades to the students' performance on standardized math and science tests later in college. Grading across all high schools showed insignificant group differences, but students from low-SES high schools who received an A in high school math and science coursework performed similar on standardized mathematics and science achievement assessments administered in college to students in the highest income high schools who received a D in high

school math and science coursework (Bozick, Ingels, & Owings, 2008). Studies that analyze the relationship between SES and standardized tests suggest standardized tests are more a measure of wealth than they are of academic ability. A study from Dixon-Román, Everson, and McArdle (2013) estimated the impact of race and poverty on standardized test scores and high school achievement using structural equation modeling. The study found parents' education and income both correlated with standardized test scores, an observation that disproportionately benefited White students in the sample population given their greater representation in high income households. High school GPA is perhaps an efficient and logical tool for predicting FGPA, but the emphasis placed on academic readiness overshadows other meaningful attributes students need in order to succeed in college and comes with its own risk if academic achievement is not evaluated in light of the opportunities and resources available to a student (Camara, 2005).

Claims that standardized tests are more a measure of SES than college readiness are making the argument that achievement on standardizes tests is dependent upon access to high quality educational resources, both in and outside of school. These claims are supported by a comparative study of college prep course offerings at high schools from across the United States conducted by Awilda Rodriguez. In her study, Rodriguez (2018) found low-income and African American students more likely to attend high schools that offer math courses that *meet* the minimum requirements of their state flagship institution, while White, Asian, and high-income students were more likely to attend a high school whose math courses *exceeded* minimum requirements for highly selective flagship schools. This difference in course offerings observed by Rodriguez is one possible explanation for the observed group differences in standardized test scores: low-SES students are not receiving preparation for standardized tests in their schools equal to that of high-SES students. Ultimately, to appeal to college admissions personnel,

applicants should demonstrate that they have taken the most rigorous courses available to them, primarily college prep and AP coursework, as a way of demonstrating their academic preparation and willingness to challenge themselves (Sternberg, 2010).

Further confounding the explanatory power of standardized tests is the effect of coaching on test scores. The issue with coaching is not simply that it distorts scores, but that access to coaching often requires a substantial investment on the part of the test taker and their family making access largely dependent upon family income. Patricia McDonough (1997) first documented how family income mediates access to college planning resources like test prep courses in interviews with prospective college students, their families, and their high school counselors at three high schools that differed by the socioeconomic status of the communities they served. McDonough's work demonstrates how access to high quality college educational opportunities that go beyond access to college prep course is mediated by wealth. McDonough found prospective college students from upper-middle-class backgrounds, urged on by the pressure to attend elite institutes, invested in the assistance of a private admissions counselor to assist with standardized test prep, essay writing, and general navigation of the admissions process while lower income students were more likely to depend on school-based resources such as their guidance counselor for college planning support. McDonough also found the ability of guidance counselors at lower income schools to provide individualized guidance constrained by their responsibilities outside of college advising (McDonough, 1994). The pressure to differentiate themselves from other applicants to highly selective colleges has resulted in an academic "arms race" among students and their families wherein the exceedingly wealthy further exert their distinct advantage over the less well-off (Klugman, 2013).

To address the effects of SES on college access institutions may include nonacademic measures of college readiness in their predictive models as a way of improving the accuracy of predicting FGPA and broader, nonacademic aspects of college success. In the following section, I examine how different nonacademic factors are used in the college admissions process.

### *2.1.2 Nonacademic factors of college readiness*

Nonacademic factors of college readiness, often called noncognitive or twenty-first century skills, are measures of college readiness that are believed to contribute to a student's adjustment to higher education (Sommerfeld, 2011). The concept of nonacademic factors includes a wide array of factors that might contribute to a student's transition into college. Camara (2005) reviewed empirical studies that used what he called "noncognitive measures" used in admissions and classified them into three categories: Noncognitive scales, personal qualities and biographical experiences, and applicant characteristics. In this section, I discuss the first two categories, noncognitive scales and personal qualities and biographical experiences. Camara's third category, applicant characteristics, consist of applicant characteristics such as race, ethnicity, and even an applicant's declaration of major. Applicant characteristics are an important component of application review. My discussion of applicant characteristics is interwoven throughout this chapter as a way of describing how applicant characteristics such as race and socioeconomic status relate to different admissions criteria and outcomes. Camara also included contextual factors about an applicant's high school or other environments in a category called "other." I discuss the different sources of contextual information separately as their own factors of college success.

***Measures of noncognitive attributes.*** Measures of noncognitive attributes communicate information about an applicant's temperament and personality. They utilize formal instruments,

primarily self-reported appraisals, to measure personality traits, interests, and values, with some instruments having been developed specifically for college admissions such as William Sedlacek's Noncognitive Questionnaire (NCQ). The NCQ is often cited in empirical studies of college admissions that include formal instruments for measuring nonacademic predictors of college success. Through self-reports and teacher evaluations of the student, the NCQ measures eight noncognitive variables: positive self-concept, realistic self-appraisal, successfully handling the system (racism), preference for long-term goals, availability of strong support person, leadership experience, community involvement, and knowledge acquired in a field. (Sedlacek, 2004, pp. 52-54). Studies of its use in admissions decisions have demonstrated a positive correlation with measures of academic performance with fewer group differences leading many to argue that they are a fairer admissions tool than traditional academic criteria (Zwick, 2017). Criticisms of the NCQ and other self-reported noncognitive scales is the fact that the preferred responses are often obvious and thus may not be an authentic representation of the student's temperament or personality (Zwick, 2017). Rather than being used to predict broader concepts of college success, the NCQ has primarily been used to improve the incremental validity of predicting FGPA (Camara, 2005).

Other notable instruments for measuring noncognitive attributes include Robert J. Sternberg's Rainbow and Kaleidoscope tests (Sternberg, 2010). The Rainbow test employed multiple-choice questions to measure analytical, creative, and practical skills, each with sub-constructs of verbal, quantitative, and "figural" (spatial) reasoning. Sternberg and his team later developed the Kaleidoscope test to measure verbal, quantitative, and figural reasoning but added assessments of wisdom to the new test. Despite their common focus on these skills there are notable differences between the Rainbow and Kaleidoscope tests. While the Rainbow test is a

timed test, the Kaleidoscope tests was an optional essay question for admission to Tufts University during Sternberg's time working there. In describing these two tests, Zwick (2017) notes how they are distinct from traditional admissions tests in that they require "composing shorts stories, captioning cartoons, and answering navigation questions based on a map" (p. 146). Sternberg (2010) and his colleagues developed the two tests to supplement rather than entirely replace standardized test scores. Studies conducted by Sternberg and colleagues of their use in admissions decisions demonstrated that like the NCQ, the Rainbow and Kaleidoscope tests both demonstrate a positive correlation with FGPA when combined into a composite score with an applicant's standardized test results with fewer group differences observed.

A recent effort to develop and scale an assessment infrastructure for measuring and reporting information about noncognitive attributes is worth noting before moving ahead with my review of nonacademic factors. In 2023, Educational Testing Services (ETS: the administrators of the SAT) and the Carnegie Foundation for the Advancement of Teaching (the creators of the Carnegie credit hour) announced the *Skills for the Future* initiative in a report authored jointly by both institutions (Liu, et al., 2023). In their report outlining the initiative ETS and the Carnegie Foundation for the Advancement of Teaching acknowledge that the tools that each developed over 100 years ago no longer fit the model of learning as we understand it today. The SAT and Carnegie credit hour emerged at a time when educational reform focused on defining relatively narrow and linear pathways through schooling and improving the efficiency of instruction through principles of scientific management. ETS and the Carnegie Foundation for the Advancement of Teaching argue these tools are insufficient for capturing the valuable learning taking place outside of schools. The goal of the initiative is to develop and scale an infrastructure for assessing and documenting nonacademic factors, specifically a taxonomy of 30

skills commonly featured in competency frameworks that define the skills needed to succeed in K-12, postsecondary education, and the workforce in the 21st century. One argument given for the initiative is that assessments of cognitive skills and disciplinary knowledge already capture information on affect and behavior but do so indirectly: as in the multidimensional nature of high school grades. Liu and colleagues (2023) conclude their report by imagining an assessment infrastructure for the 30 Skills for the Future where multimodal data is collected through stealth assessment (assessment embedded into technology-rich learning environments) and parsed using machine learning processes.

***Personal qualities and biographical experiences.*** The second category of nonacademic predictors discussed by Camara (2005) and Sternberg (2010) includes personal qualities and biographical experiences. These predictors are typically communicated through traditional qualitative application materials such as letters of recommendation, personal essays, and inventories of extracurricular activities. Elite Ivy League institutions began using these materials during the rise of selective admissions in the 1920s. As I discussed in the introduction to this dissertation, considering "character" in the admissions decisions was often used as a legally defensible way of restricting the number of students with Eastern European Jewish heritage. The applicant pools at Ivy League institutions also grew substantially during this time as improved transportation allowed them to compete for qualified applicants from both their existing networks of eastern boarding schools as well as new networks from the growing suburbs of the Midwest and west. As Ivy League colleges became more geographically diverse. it became more difficult to select applicants using academic predictors alone. The first documented instance of selective admissions occurred at Dartmouth University (then College) in 1919 when the admissions office rejected 100 qualified applicants (Levine, 1986, p. 138). Including qualitative

application materials allowed these institutions to discriminate between otherwise identical (academically speaking) applicants based on aspects of an applicant's character. During the Civil Rights movement of the 1960s Ivy League institutions like Yale and Princeton turned to selective admissions requirements as a way of addressing inequities in both the racial and gender make-up of their admitted classes (Karabel, 2005).

Today, qualitative application materials are also the most likely place for students to discuss their informal learning experiences. Students may be prompted to share meaningful learning experiences by a personal essay prompt, or they may inventory their interests outside of school in a list of extracurricular materials. A teacher recommendation may come from the advisor of one of the applicant's student clubs, and a well-written counselor report is likely to include some reference to a student's involvement in activities outside of school. Most of these materials, if not all of them, can now be submitted through the Common Application. The Common Application is a national non-profit organization begun in 1975 by 16 private colleges with selective admissions standards and employing holistic application review. The Common Application is a centralized college application that allows applicants to submit a single application to multiple colleges at one time rather than submitting individualized applications directly to each college. When it was established, applicants submitted using a paper application. Today, the Common Application is available online and students can submit applications to as many as 20 schools. And because membership is no longer limited to selective institutions membership stands at roughly 700 institutions—any institution using holistic review procedures may join (Ehrenberg & Liu, 2007).

Research on the Common Application has focused on how it reduces barriers to applying to college while also increasing the number of applications institutions receive. To understand

the effect of adopting the Common Application on application volume, Knight and Schiff (2022) analyzed panel data from the College Board's Annual Survey of Colleges from 1990 to 2016 to determine the number of applications each institution responding to the survey received each year over the course of this time period. To estimate the effect of adopting the Common Application on an institutions' application volume Knight and Schiff analyzed the increase in applications received by institutions included in the College Board's survey following the date the institution joined the Common Application. Their results suggest adoption of the Common Application significantly increases the total number of applications received by 10% on average for member institutions in the year following adoption and by as much as 23% after eight years while reducing yield by 9% on average. From these results, Knight and Schiff conclude that the Common Application reduces barriers in the application process and increases student choice. In the remainder of this section, I discuss the admissions materials that can be submitted through the Common Application and used to evaluate personal qualities and biographical experiences: letters of recommendation, personal essays, and lists inventorying extracurricular engagement, as well as relevant research on the impact that each of these elements has had on improving the information available in the college admissions process.

***Letters of recommendation.*** Letters of recommendation are meant to collect insight into the attributes that will make a particular student successful from the people who are most directly able to speak to those attributes—their teachers and counselors. This will typically happen through a short letter about the student but may also include ratings on different aspects of the student's personal qualities depending on what a particular admissions department requests from the recommender (Camara, 2005). In reviewing the use of letters of recommendation in admissions, Sternberg (2010) found college admissions professionals criticized them for inflating

students' attributes or for coming from an inappropriate recommender (anyone that is not a teacher or counselor of the student). Sternberg notes that one reason recommenders might inflate a student's attributes is because they are comparing the student to their peers within their own school or community. To the local teacher, it might be true that the student they are recommending is the best they have ever seen, but this claim may not hold true when the student is compared to a larger pool of applicants.

***Personal essays.*** Personal essays (also called personal statements) can be used as a direct assessment of writing ability or an indirect assessment of nonacademic factors of college readiness. Camara (2005) lists three typical essay prompts: overcoming adversity, special talent, or life experience (p. 95). Sternberg describes the centralization of personal essays on the Common Application as a disadvantage because in order to be useful to a wide range of institutions the prompts are usually open-ended and too general for making meaningful assessments. Sternberg (2010) also notes that essays are highly susceptible to coaching, calling their authenticity into question.

Citing a lack of empirical studies that analyze the relationship between personal essays and socioeconomic state, Alvero, et al. (2021) used machine learning techniques to analyze the relationship between the content and style of essays submitted as part of 60,000 applications to the University of California system in 2016. They compared the content and style of these essays to students' self-reported household income and SAT scores. Their results demonstrate essay content and style strongly correlate with household income with the relationship being stronger than the correlation between household income and SAT scores. In a related study, Gebre-Medhin et al., (2022) conducted a content analysis for signals of socioeconomic stratification in the same 60,000 applications used in Alvero and colleagues study. They found some topics

discussed by applicants did in fact associate with hosuehold income more than others. For example, essays that discussed economic or maternal insecurity, abuse, or domistic insecurity associated with low household income applicants while higher household income applicants tending to discuss challenges related to sports, interpresonal and emotional issues, and mental health problems.

Another issue with personal essays is the reliability of how they are scored. Like grades, both college admissions offices and individual application readers will have their own approach to reviewing and evaluating a personal essay. The challenge is ensuring the reliability of scores between raters. Recent research using artificial intelligence to evaluate nonacademic factors in student essays may provide a potential solution. Starting from the premise that the holistic assessment of personal qualities in college admissions is opaque and resource intensive, Lira and colleagues (2023) asked how reliably a Large Language Model developed by their team could evaluate personal qualities expressed through 150-word essays about extracurricular activities submitted as part of an applicant's Common Application. The authors first asked real-life application readers to rate a subsample of 3,131 short essays based on the presence or absence of different personal qualities from a larger sample of 309,594 essays. Ratings were then used to fine-tune an existing large language model consisting of text from Facebook, Wikipedia, books, news, and other media. They then confirmed the models use on the remaining 306,463 essays that were not used to train the model. Results from the study show that the large language model ratings correlated strongly with human ratings and demonstrated no group differences. The large language model also reliably predicted graduation as well as human raters. It should be noted that the use of artificial intelligence (AI) in college admissions is in the early stages of development. While the study by Lira and colleagues is a promising demonstration of using AI

in college admissions, it is unclear exactly how such a technology would or should be employed, and how it would or would not disrupt current admissions practices.

***Extracurricular engagement.*** The Common Application activities page allows applicants to list the extracurricular activities in which they have participated. To develop their activities lists, applicants first report the type of activity using a drop-down menu of 30 possible activities including home responsibilities, employment, and an open "other" field for types of activities not included in the list. Applicants can then report any roles they held with each activity, describe each activity in 150 words or less, and report information on the frequency of engagement ranging from the number of hours they engaged in the activity each week, month, semester, and year. Most issues with extracurricular engagement relate to the way in which it is mediated by race and social class. For example, a study of the Common Application by Park et al (2023) suggests relying on extracurricular engagement may further perpetuate inequality if we assume that more extracurricular engagement (defined as the number of activities listed) means a greater chance of admission. In their study of a sample of Common Application activity lists submitted by real applicants they found White and Asian students on average listed more extracurricular activities and leadership positions than African American and Hispanic students (Park et al., 2023). This is consistent with earlier work of Jayakumar and Page (2021). In their study, Jayakumar and Page note that decades of research work on admissions processes at elite higher education institutions that examine the relationship between admissions and social stratification have primarily focused on the relationship between academic performance in high school and inequitable access to academic resources. Wanting to apply this observation to extracurricular activities, Jayakumar and Page developed and tested a probability model of exceptionalism in high school athletics. The model considered three factors related to athletic exceptionalism:

availability of diverse athletic opportunities, opportunities to participate in specialized sports (e.g., fencing), and the availability of additional support needed to excel such as the financial resources needed to pay for private coaching. The model illustrates how exceptionalism in extracurricular activities disproportionately favors high-SES students at the most selective higher education institutions. Their study did not, however, evaluate how exceptionalism in extracurricular engagement is understood or how it is used in admissions decisions.

Parenting styles have also been shown to influence extracurricular engagement patterns. In her research on the interaction of social class engagement in extracurricular activities, Annette Lareau found parents of high-SES students more likely to purposefully shape their child's experiences outside of school, what she called "concerted cultivation," than low-SES parents due to cost and time restrictions that disproportionately impacted low-SES parents (Lareau, 2006). Lareau's findings are supported by Bennet, Lutz, and Jayaram's (2012) study of the parental logic behind structured extracurricular engagement at two racially diverse middle schools: one a neighborhood-zoned school composed of primarily working-class students the other a city-wide magnet school composed primarily of middle-class students. Bennet, Lutz, and Jayaram found extracurricular engagement patterns varied by socioeconomic status in meaningful ways. To begin, Bennet, Lutz, and Jayaram found both middle- and working-class parents expressed concerns about the activity level of a fictional child's extracurricular activity schedule, however, middle-class parents, more so than working-class parents, expressed a deference to what their child wanted to do rather than what the parent thought was best for the child. Similarly, the working-class parents tended to see structured engagement as a means of keeping their child safe more so than middle-class parents. Ways in which parental logics agreed regardless of class included supporting the child's interests, the personal development of the child (e.g., "opening

doors and exploring new things"), and cultivating academic knowledge (pp. 140-141). Ultimately, Bennet, Lutz, and Jayaram argue that both the financial constraints of the parents and the structural constraints of the schools (what the school offered for extracurricular activities) account for the diverging patterns of engagement. For instance, they found middle-class students more likely to engage in elite versus non-elite activities than the working-class students while working-class students were more likely to engage in religious activities.

### *2.1.3 Contextual factors used in holistic review*

Contextual factors are a key component of holistic review. Holistic review aims to situate the achievements of an application within the context of their own lived experience. This allows admissions offices to evaluate an applicant's achievements relative to the resources and opportunities available to the applicant. As such, holistic review is dependent upon the availability of information that describes the different contexts of an applicant's life such as the availability of advanced coursework at an applicant's high school or the educational background of an applicant's parents. Research that has examined the characteristics and use of contextual information used in holistic review has focused on understanding the quality of high school and neighborhood contextual information available to application readers. This work has found the quality of contextual information about an applicant can vary from high school to high school with applicants from wealthier schools typically providing more detailed information about the school and its students (Bastedo & Bowman, 2017; Nicola, 2021). Tara Nicola (2021) conducted interviews with 25 admissions officers to understand the ideal components of a school profile and a content analysis of 100 high school profiles to understand how school profile content correlated with the socioeconomic status of the high school sending it. It is typical for a high school to submit a profile of its curriculum and information about student achievement with

every academic transcript it sends to a college on behalf of one of its students. Nicola identified fourteen critical elements school profiles should include to support holistic review grouped into the following four categories: academic curriculum, grading systems, postsecondary outcomes, and school community. The content analysis of school profiles suggests not all school profiles are created equally. Out of the profiles analyzed by Nicola, most contained only nine elements and only one school, an elite boarding school, contained all fourteen elements. The five most common elements included school mailing address and website, grading scales and policies, graduation requirements, school demographic information, and a list of course offered (Nicola, 2021, p. 11). Furthermore, more than a third did not contain information on class rank or the GPA distribution of its students. Meaningful variations also existed by high school type. Nicola found private schools more likely to include information on institutional policies, specific school initiatives, and postsecondary outcomes of alumni than public schools. Finally, 91% of elite schools (both public and private) included comprehensive information on grading policies compared to just over half of schools in the study not designated as elite (Nicola, 2021).

Experimental studies have been used to examine the potential impact of provisioning novel forms of contextual data through standardized dashboards. In their study of contextual information and holistic review of college applications, Bastedo and Bowman (2017) found most admissions professionals lack consistent information on high school contexts. To test whether providing consistent and detailed information could result in more equitable access for low-income students, Bastedo and Bowman recruited college admissions personnel to take part in an experimental study involving the manipulation of contextual information provided during holistic review. College admissions personnel recruited for the study were provided with three applications that varied by rigor of academic coursework and academic performance (grades and

standardized tests scores). Two files described high-SES students who varied in their academic credentials: one with high academic achievement and another with low academic achievement. The third file described a low-SES student with high academic achievement. Participants were then randomly assigned to either a limited- or detailed-information condition. Those receiving limited information received only the following information: high school name (fictitious), state, institutional control (public), number of students, graduation rate, and parental education. To reflect outcomes strongly associated with socioeconomic status, the high-SES students attended high schools with higher graduation rates and had parents with higher levels of education than the low-SES student. In addition to this information, the detailed-information condition also included the following information about the student's high school: enrollment rates at 2- and 4-year institutions, average standardized test scores, percentage of students receiving free and reduced lunch, percentage of students with limited English proficiency, the number of Advanced Placement (AP) courses offered at by the high school, and the percentage of students who took an AP test and received a 3 or higher. Results demonstrated that providing detailed information on high school context increases the likelihood that a low-SES, high-achieving student will be admitted to a selective institution. Furthermore, admissions professionals receiving detailed information are less likely to admit a high-SES, high-achieving student than those receiving limited information.

Building off of the study by Bastedo and Bowman (2017), Bastedo and colleagues (Bastedo, et al., 2022), in partnership with the College Board, developed an environmental context dashboard that provides detailed information on students' neighborhoods and high schools. The information provided through the dashboard includes much of the information included in Bastedo and Bowman's experimental study discussed above but also includes

detailed information on neighborhood education and employment outcomes and crime rates. Bastedo and colleagues then used the dashboard in an experimental study in which admissions professionals reviewed application files from previous years. Application readers read these files with the dashboard and made new admissions decision without knowing the original decision. The new decisions were then compared to the original decision to estimate the impact of using the dashboard. Results reflected those of the original experimental study described in Bastedo and Bowman: providing robust contextual information improves the likelihood of admitting students of low socioeconomic status. However, the study did not provide details on how the evaluations of specific admissions criteria other than grade-point average and SAT changed once contextual information was provided to admissions officers. As a result, while we understand that priming admissions officers with contextual information increases access for low-SES students, we know less about how admissions officers are using the information to interpret the different components of the application file. The environmental context dashboard, known as Landscape, is now available for colleges to use for a fee.

### *2.1.4 Holistic review of college applications—how is it practiced?*

A detailed study of the holistic review process can be found in Mitchell Steven's *Creating a Class* (2007). Steven's work presents insight into holistic review processes based on an ethnography of how holistic review was practiced at one highly selective institution during Stevens's time there. Stevens emphasizes that holistic admissions decisions are inherently collaborative in that they require input from stakeholders both within and external to the institution: made possible by way of the college admissions infrastructure. In this way, college application materials work as boundary objects coordinating the work of different offices within one institution. Citing Edwin Hutchins (Hutchins, 1996) work on distributed cognition, Stevens

describes holistic review as an indirect assessment of applicants. It is not a direct assessment of what applicants know and can do, but rather the evaluation and judgement of different aspects of the applicant made by a various actors distributed throughout the applicant's social network. This includes academic assessments and recommendations from school officials, self-assessments made by the applicant themselves, and any other actor that advocates on behalf of the applicant.

Stevens described holistic review as proceeding through three stages: reading and rating, storytelling, and class crafting. While the implementation of holistic admissions practices is likely to vary from institution-to-institution Steven's description provides useful insight into the process. Stevens describes each stage as consisting of both "course sorts" and "fine distinctions" of applications depending upon the objective of the stage. This in turn shapes how information contained in the application is used; whether it is coarsely sorted or used for finer distinctions.

Stevens describes his first stage of holistic review, reading and rating, as consisting primarily of course sorts of applications but also including situations where fine distinctions are made. This is the stage at which each application is scored and categorized as either an easy deny, easy admit, or placed in "a large middle category" based on a composite score which includes ratings of an applicant's academic and nonacademic achievement and financial aid ratings (p. 191). The fine distinctions made during this first stage come in the form of individualized evaluation of each application. Stevens indicates that no application is entirely dismissed at this stage based on one criterion alone but rather requires failing to meet multiple criteria for admission. However, in his account of this stage, Stevens noted that academic criteria are given the most weight.

Finer distinctions made between applications play a more significant role in Steven's second stage of holistic review: evaluative storytelling. At this stage the admissions committee

reviews and votes on the "large middle category" of applications that were not a clear admit or clear deny. Because each applicant at this stage meets minimum academic requirements for admission, information beyond academic potential is needed to make finer distinctions. These finer distinctions occur during committee review at which admissions officers advocate on behalf of the applications they want to admit. Stevens found college admissions personnel often relied on what he called "narrative raw material" to fill in gaps within an application or make a stronger case for a particular applicant that they found deserving of a spot at the college (p. 200). Narrative raw material is not a specific type of information, but rather the tacit knowledge about an applicant's background that an admissions officer uses to tell a compelling and convincing story about the applicant. Stevens found that the high school guidance counselor is a common source for narrative raw material, and that the social processes that produce narrative raw material tend to favor those who are already well positioned for admission such as athletic recruits or relatives of current or potential donors.

Stevens's discussion of class crafting, his final stage of holistic review, is brief compared to the attention he gives to his first two stages. When crafting the class, college admissions personnel primarily work to balance the different requirements and demands placed on its office by stakeholders to the admissions process, both internal and external to the institution such as financial aid, athletics, guidance counselors at feeder schools, and donors. At this final stage, specific applications may be reconsidered and reclassified as admit or deny based on any number of reasons such as the institution's requirement to admit a class within its financial aid budget, its need to field competitive varsity athletic teams, and the importance of maintaining vital links to feeder schools.

More recent research on holistic review has focused on understanding differences in how nonacademic factors are used at selective compared to access-driven institutions. Based on interviews with 19 college admissions personnel at ten institutions and a survey of an additional 241 admissions personnel, Hossler et al. (2019) examined the specific types of nonacademic factors used in admissions decisions, finding performance factors (levels of engagement in activities, general proficiency, effort, leadership, and teamwork), attitudinal factors (self-concept, self-efficacy, interests, and attitude), creativity, and grit as the most commonly considered factors. Findings from interviews and the survey suggest academic and contextual factors (such as applicant attributes and information on where they went to school) are the most important criteria used in holistic review. College admissions personnel indicated using nonacademic factors in all of their admissions decisions but reported giving them less weight than academic and contextual factors, a finding that is consistent with Stevens (2007). Hossler and colleagues found little evidence of the use of noncognitive scales: most offices relied on qualitative application materials such as personal essays, letters of recommendation, and inventories of extracurricular engagement to understand nonacademic factors. Admissions officers also reported using standardized evaluation forms to reduce bias and document evaluation procedures (Hossler et al., 2019).

Results from Hossler and colleagues' study suggests that the relative significance of nonacademic factors to admissions decisions varies based on institutional selectivity and institutional control (public versus private). At selective institutions, those with a low acceptance rate, nonacademic factors were considered in every admissions decision. And because applicants generally all meet minimum academic requirements, nonacademic and contextual factors ultimately carried more weight than academic factors. At access-driven institutions, those that

admit all who meet minimum academic requirements, Hossler and colleagues found institutions more likely to use formulaic approaches to admission. In situations where formulaic admissions practices were used, college admissions personnel sorted applicants by academic factors first and only looked for evidence of nonacademic factors with applicants who failed to meet minimum academic requirements for admission. In these situations, students were admitted if they demonstrated nonacademic factors in some aspect of their life.

Findings similar to Hossler et al. (2019), Chetty, Deming, and Friedman (2023) examined the benefit of being wealthy to one's chances of admission to an elite university. The study included internal admissions assessments from three of twelve participating elite private universities. Their analysis of this internal admissions assessments showed no association between higher academic ratings and higher socioeconomic status for those applicants with the same standardized test scores. Specifically, students tended to differentiate themselves through letters of recommendation and nonacademic factors. However, higher ratings in these categories did tend to associate with an applicant's wealth and significantly increasing their chances of admission (Chetty, Deming, & Friedman, 2023).

Work by Bastedo, Bowman, Glasner, and Kelly (2018) also suggests that among selective institutions, the approach to holistic review may vary in significant ways from reviewer to reviewer. Using open-ended survey data of 311 college admissions officers at 174 U.S. institutions, Bastedo and colleagues asked admissions officers to describe their approach to reviewing applications. The results suggest that an overwhelming majority of admissions officers at selective institutions (95%) believe they review applications holistically. Results also indicate that despite a general lack of conceptual agreement on what holistic review entailed in practice, participants described patterns representative of three typologies: Whole Context, Whole File,

and Whole Person. Whole Context means family and school contextual data are used to understand hardship and academic achievement as it relates to opportunity. Whole File is a belief that a holistic review means reading all parts of the application. Whole Person means using application materials to understand the personal characteristics and achievements that make an applicant unique.

Another perspective on the holistic review process comes from Sukumar, Metoyer, and He (2018). This study is noteworthy for being the only one that investigated holistic review as a human-computer interaction problem. In their study, Sukumar, Metoyer, and He observed the holistic review process at one selective institution with the goal of outlining the structure of holistic review to reveal its different steps and the challenges college application personnel face in their evaluation process. The authors characterized holistic review as consisting of three stages: travel, recruitment, and yield. They found the travel and recrutiment seasons, the time during which college application personnel visit different high schools and students within their recruitment area, vital to gaining contextual information later used to holistically evaluate an applicant's application. Sukumar, Metoyer, and He (2018) found the primary tools used during holistic review to be annotation tools for documenting inferences gleaned from different application materials and a decision sheet where inferences are recorded as evaluations. They observed that college admissions personnel rely primarily on static textual data pieced together from different information sources from various parts of the application to form subjective evaluations of an applicant's college readiness, a process they described as "reading between the lines" (Sukumar, Metoyer, & He, 2018, p. 8). They argue that because application reader's bring different levels of knowledge and expertice to the evaluation process, and because they are processing large amounts of static textual information there is great risk for cognitive biases.

They make a number of recommendations for leveraging different descision-support tools in the holistic review process, specifically data visualization tools and storytelling tools that would allow them to link inferences to specific evidence and link evidence to conclusions.

Finally, of primary concern to this dissertation is evidence that the consideration of nonacademic factors may further perpetuate inequitable access to higher education (Rosinger et al, 2021). Rosinger and colleagues used panel data from an annual survey of college administrators known as the Common Data Set from 2008 to 2016 to analyze how a change in what is considered in the admissions process correlates with changes in the representation of marginalized students (racial minorities and Pell grant recipients) at selective institutions. The independent variables used by Rosinger and colleagues included the ratings administrators gave to these different criteria over time. Their analysis demonstrated that an increased emphasis on extracurricular activities correlated with a drop in the representation of Pell grant recipients at all institutions while an increased emphasis on what they called subjective factors resulted in a drop in the representation of Pell grant recipients at only the most selective institutions. When first-generation status was taken into consideration, an increased emphasis on extracurricular engagement resulted in a lower representation of Pell grant eligible students. Taken together, the results suggest that the consideration of a wider range of college readiness indicators may actually perpetuate inequalities in admissions rather than remedy them.

One final note on Rosinger et al. (2021): while not investigated in their study, in their review of different admissions criteria Rosinger and colleagues presented hypothetical questions about how the structure of extracurricular activities may interact with how they are evaluated in admissions. To clarify their question, they describe two hypothetical students who play basketball. One plays on a formal team while the other organizes games at their local park.

Rosinger and colleagues wonder if the opportunity to earn formal indicators of achievement and success in basketball (such as wins and awards) is an advantage in the admissions process.

Whether or not perceptions of the extracurricular activity's structure are taken into consideration when it is evaluated by an admissions officer is one question explored in this study. More specifically, how do admissions officers evaluate less-formal extracurricular activities such as the exploration of a personal interest or sports and club participation not associated with a school or formal organization.

### *2.1.5 Synthesis: The limitations of the boundary objects of college admissions*

The college admissions infrastructure has changed significantly since the turn of the 20th century when the articulation movement established standard criteria for admission to higher education. This system made it easier for admissions offices to evaluate and verify an applicant's qualifications and increased access to college even if only for a select population of privileged individuals. But at the same time, the concept of what it meant to be "college ready" was quite narrow including only academic criteria such as the courses one took in high school and the grades one received in those courses. This began to change in the 1920s with the rise of selective admissions at elite higher education institutions. At this time, Ivy League schools began to look for new boundary objects of college readiness such as character attributes because academic criteria alone no longer sufficed as a tool for differentiating between a pool of applicants that were geographically diverse and also academically qualified (Levine, 1986). As a result, admissions offices began to use qualitative application materials such as letters of recommendation, personal essays, and information on an applicant's extracurricular engagement to decide who merited access to their institutions.

Unfortunately, these changes have done little to address the issue of equitable access to higher education. Standardized tests correlate with socioeconomic status more than ability (Dixon-Ramon, Everson, & McArdle, 2013), low-income students often have less access to advanced coursework and test prep than students at wealthier schools (Rodriguez, 2018), wealthier students can benefit from private counseling (McDonough, 1997), essays and recommendation letters can be coached (Sternberg, 2020), and extracurricular involvement depends on access to opportunities , which are unequal across communities (Lareau, 2006; Bennet, Lutz, & Jayaram, 2012; Jayakumar & Page, 2021). Higher education is meant to be an equalizer, but in nearly every aspect it falls very short of this goal. Rather than democratizing access to higher, particularly elite higher education, the inclusion of new admissions criteria has tended to perpetuate the advantage wealthier applicants have in college admissions. This is outcome is clear from work cited above from Chetty, Deming, and Friedman (2023); even when academic criteria are considered equal, wealthier applicants still enjoy a distinct advantage from the other elements of their application.

Another limitation of the college admissions infrastructure is that even though admissions officers have included new criteria that allow students to discuss their informal learning experiences and learning experiences outside of school, academic criteria remain the primary focus of admissions decisions. For example, even though institutions have expanded the criteria used to make admissions decisions, because they carry the most weight in the final decisions academic measures are still privileged in the process and weight heavily on admissions decisions. Furthermore, while provisioning robust contextual information has been shown to reduce some of the inequities in college admissions decisions, findings from work reviewed in this chapter suggests that contextual information is primarily used to interpret academic

indicators of college readiness. For highly selective institutions where most applicants meet academic standards for admission, it is unclear if including contextual information in the admissions decision makes much of a difference, nor is it clear exactly how it might be used to contextualize other parts of the application. This last point is particularly important in light of studies that have demonstrated the association between wealth and exceptionalism in extracurricular engagements (Jayakumar & Page, 2021).

In summary, while new boundary objects of college readiness have been added to the college admissions infrastructure over time, none have been able to address the fundamental issue of expanding access to higher education because of the increased reliance on academic measures of college readiness. In fact, in many situations including new ways of understanding college readiness has actually exacerbated the problem. Recently, researchers who develop and study informal learning networks have looked to alternative digital credentials as a potential tool for communicating information about youth learning outside of school to college admissions (Fishman, Teasley, & Cederquist, 2018; Pitt, Bell, Strickman, & Davis, 2019; Martin, Gutierrez, & Muldoon, 2020). This work has also produced innovative methods for visualizing the availability of informal learning experiences within defined communities. In the following section, I review this literature and discuss their potential use in college admissions.

## 2.2 Alternative digital credentials: The origins of digital badges in research on digital media and learning

As discussed in the introduction to this dissertation, digital badges are one component of a larger alternative digital credentialing system known as the Learn-and-Work Ecosystem that includes microcredential programs, credential issuing platforms, comprehensive learning records, tools for curating and sharing digital credentials, and competency frameworks. Digital

badges emerged around 2010 out of a wave of philanthropic investment by the MacArthur Foundation into research on digital media and learning. The rise and increased significance of the Internet in the day-to-day lives of people during the first decade of the 21st century motivated their funding of numerous digital media and learning projects, primarily with youth living in under-resourced urban communities. Studies focused on building social and technical infrastructure to support networked learning environments and tools for connecting learning across different learning contexts such as schools, libraries, and museums. The research was conducted within five cities across the United States designated as "cities of learning" (Casilli & Hickey, 2016). Digital badges came specifically from a MacArthur Foundation funded digital media and learning project between Peer-2-Peer University, a nonprofit open learning community, and Mozilla, a nonprofit open-source software organization. Digital badges were developed as the tool for connecting learning across different learning contexts (Knight E. , 2010). Mozilla found that their users were demonstrating programming skills through their work on various open-source software supported by Mozilla and wanted a way to formally credential these skills. The project resulted in the publication of the Open Badge infrastructure (OBI) standard (Gibson, Ostashewski, Flintoff, Grant, & Knight, 2015), now in its third version. In the following section, I discuss the features and affordances of digital badges as well as common critiques of digital badges. I then review select prior work that has studied the potential of building pathways between informal learning and higher education using alternative digital credentials. I conclude the literature review with a deeper dive into one city of learning project that developed a method for visually representing the availability of informal learning opportunities within communities.

### *2.2.1 Digital badges for connected and informal learning*

Gibson, Ostashewski, Flintoff, Grant, and Knight (2015) provide one of the most cited definitions of digital badges: "A digital badge is a representation of an accomplishment, interest or affiliation that is visual, available online, and contains metadata including links that help explain the context, meaning, process and results of an activity" (p. 404). Digital badges serve as the visual representation of a microcredential, a unit of learning that can be smaller than the course and shared with consumers of credentials such as employers and college admissions officers. The ability to embed digital badges with metadata, particularly evidence of learning such as student work examples, is the defining feature of digital badges and what sets them apart from traditional credentials. The OBI standard dictates that digital badges should include metadata detailing who issued the badge and who earned it, a competency statement detailing what had to be demonstrated to earn the badge, evidence of that demonstration, the badges' alignment with a competency framework, and the method of assessment (Lockley, Derryberry, & West, 2016). But these are only minimum requirements for metadata. The possibilities of what an issuer could conceivably include as metadata opens a number of ways for supporting learners over the longer term with digital badges.

Metadata is significant because it is what makes the affordances and transformative potential of digital badges possible. Metadata can be used to visualize and identify progress along an individualized learning pathway by aggregating and connecting data on past and future learning opportunities (Casilli & Hickey, 2016; Pittinsky, 2022). Through machine-readable metadata about past learning experiences, credential issuing platforms are able to find and recommend related learning opportunities which supports personalized and interest-driven learning. Metadata embedded within a digital badge are also used to incentivize learning as a

form of motivation within instructional systems. Credential issuing platforms can be programmed with “triggers” that awarded badges after the demonstration of a discrete skill. Adopted from game design, triggers make skill recognition and feedback automatic and timely. As youth progress through a learning program demonstrating different knowledge and skills, they can be automatically awarded badges for completing tasks which in turn opens pathways into new learning opportunities (Fanfarelli & McDaniel, 2019). This is the idea that digital badges are “talkative objects” with figurative tails and antenna linking digital badges by their relationships to each other and providing learners with directions and recommendations for taking their learning further (Rughingis, 2013).

Digital badge metadata can also be used to signify qualifications in a transparent and searchable manner. With traditional credentials skills are differentiated by academic major and degree. There is very little information about specific skills related to the major let alone specific information about the unique skill profile of an individual graduate. Digital badges, on the other hand, can be used to break learning into smaller components allowing for the representation of learning at a much more granular level, what is often called “unbundling” the credential. Providing more individualized information on a student’s mastery of discipline-specific knowledge, skills, and abilities would likely improve course placement as it would then be possible to determine the extent to which a student has mastered essential requirements for advancement (Bass & Eynon, 2017)(Bass & Eynon, 2017; Langworthy & Hirsch-Allen, 2022).

Recently, comprehensive learner records (CLR) have emerged as a tool for representing the aggregation of a learner’s digital badges. CLR can be thought as a type of skill-forward e-portfolio; they catalogue examples of student work embedded in the underlying digital badges but also translate the outcomes of this work into a visual representation of learning making it

easier for someone to read and interpret. CLR are the collective representation of a student's digital badges and where curation of digital badges is likely to happen. To support the documentation and communication of the *Skills for the Future* discussed above, the Educational Testing Service (ETS) recently acquired the Mastery Transcript Consortium, an educational technology company that developed a comprehensive learning record for competency-based schools. The Mastery Transcript, as their comprehensive learning record is called, aggregates data from a student's learning experiences to visualize the student's unique competency profile. Given the significant influence the *Skills for the Future* initiative is likely to have on college admissions, the Mastery Transcript has the potential to become an important part of the college admissions infrastructure and one of the main alternative digital credentials for communicating information about informal learning. In addition to examining how alternative digital credentials can improve the legibility of informal learning in the college admissions process, this dissertation also examines the potential (and problems) of the Mastery Transcript as an exemplar alternative digital credential for increasing the legibility of informal learning in the current college admissions process.

### *2.2.2 Critiques of digital badges*

There are a number of criticisms of digital badges. Casilli and Hickey (2016) argue that the affordances of digital badges—incentivizing, visualizing, and signaling competency—are more useful for supporting behaviorist concepts of personalized learning thus making them somewhat at odds with their roots in the social-constructivist connected learning movement. Casilli and Hickey argue that digital badges are likely to have the most profound impact on our view of what constitutes a valid assessment. With a digital badge competency can be evaluated first-hand by consumers of the credential through a direct assessment of the evidence of learning

contained within the badge such as a student work example. With digital badges, the validity of an assessment is socially constructed; it occurs from the ground up. In the future, rather than interpreting standardized grades and test scores, consumers of credentials may see a wide range of student work examples as evidence of competence. While the ability to review evidence of learning directly may bring greater democratization to assessment, it also shifts the burden of curating valid evidence of competency from the institution to the individual. Ultimately, this may raise questions concerning the consequences of relying on evidence of learning to make gatekeeping decisions for different groups. While alternative digital credentials may be accessible to all, will everyone have access to the necessary resources and experiences need to curate evidence of learning in a convincing manner?

The potential of using alternative digital credentials to make gatekeeping decisions has also raised questions about how alternative digital credentials differ from the use of traditional credentials within credential markets like college admissions. Olneck (2015) raises a few concerns about digital badges, one of which is noteworthy within the context of this dissertation. Traditional credentials derive their value from being "widely recognizable, interpretable, comparable, and convertible" (Olneck, 2015, p. 5). They function at scale because there is a general understanding of what they are meant to represent. This is supported by the top-down structure of the existing credentialing system: We can assume what a bachelors degree means because accreditation requires that the degree meets universally agreed upon standards of content and quality. Digital badges, on the other hand, derive their value from the ground up: The emerge from distinct communities of practice and gain value by reputation (Grant, 2016). Olneck argues that this difference means digital badges are likely to have limited value outside of the communities where they emerged. Additionally, for those digital badges that do scale beyond a

single informal learning community, their proliferation may mean that they have limited value in credential markets that depend on credential scarcity to diffrentiate between applicants.

### *2.2.3 Connecting informal learning with higher education: A review of select prior work*

The three research projects that motivated the study described in this dissertation (Fishman, Teasley, & Cederquist, 2018; Pitt, Bell, Strickman, & Davis, 2018; Martin, Gutierrez, & Muldoon, 2020) are closely linked to the City of Learning projects in that all are motivated by the question of how to build pathways between different learning contexts using digital badges, specifically informal STEM learning and higher education. Fishman, Teasley, and Cederquist described an NSF supported workshop that brought experts from assessment, informal science learning, and higher education admissions together to generate ideas for using alternative digital credentials in admissions. The report defines the challenges that need to be addressed if digital badges are to become part of the infrastructure of college admissions. One salient issue that came from the workshop was a concern that if alternative digital credentials became a common part of the college admissions infrastructure, they would contribute to the existing admissions arms race in which students with financial means are able to purchase access to higher education through paid tutoring and access to exceptional extracurricular experiences. Participants in Fishman, Teasley, and Cederquist's workshop felt that if alternative digital credentials are used in admissions, it is imperative that they remain open and accessible to all students. A system that is not accessible to all students will only further perpetuate the problems of the existing admissions system. Specific recommendations for using alternative digital credentials in admissions included facilitating student-institution match through the alignment of interests and goals with opportunities available at colleges and universities. Participants also expressed concerns about adding additional materials to an already information intensive process. This would potentially

create additional work for both applicants and application readers. To be taken seriously in the admissions practice, participants also felt digital badges need alignment with agreed upon competency frameworks.

Pitt et al. (2019) interviewed hiring managers and college admissions officers to understand their perceptions of the utility of digital badges for applicant selection. Their informants felt alternative digital credentials showed promise for establishing the credibility of applicant's "soft skills" (i.e., personal qualities) if the credentials are verifiable. They also believed that alternative digital credentials would improve evaluation of college readiness by making hard to quantify skills and the trajectory of a student's learning more legible. This way admissions officers would be able to see and understand the context of a student's learning progression. Specific challenges highlighted by Pitt and colleagues included integrating alternative digital credentials into existing applicant-selection workflows and establishing the credibility of alternative digital credentials as a tool for sorting and selecting applicants. Pitt and colleagues, who used the concept of *boundary objects* (Star & Griesemer, , 1989;  Bowker & Star, 2000) in their theortical framework, noted that one limitation of alternative digital credentials as *boundary objects* was their finding that some participants in their study had very well-defined concepts of what expertise looks like. This suggests that while we can credential many different forms of expertise using tools like digital badges, our framework for defining expertise may not always align with that of the consumer of the credential. Admissions officers in Pitt and colleagues' study also emphasized that for alternative digital credentials to be taken seriously, they need to be used to credential skills that are meaningful to admissions officers. Admissions officers in Pitt and colleagues' study had concerns that students would focus more

on earning credentials with "good brand recognition" rather than earning credentials that are meaningful to the students and challenging to earn (Pitt et al., 2019, p. 100).

Martin, Gutierrez, and Muldoon (2020) took a different approach to the question of alternative digital credentials and college access by interviewing youth participating in an informal learning network. In their study, Martin, Gutierrez, and Muldoon interviewed youth at one informal STEM program that is a part of the New York City of Learning program known as the Design League. Run by Mouse, a national non-profit, together with Parsons School of Design, the Design League provides youth with formal and informal opportunities to work on human-centered design problems with real clients. As youth progress through the program, they can collect digital badges to document their learning and achievements. They can then use their digital badges to apply to the Parsons School of Design. Parsons's endorsement of the Design League credentialing program has also led to other schools like Hostos Community College accepting Design League digital credentials. In terms of their value to applicants, youth associated with the Design League felt the alternative digital credentials, which utilized professional design language, helped them speak confidently in a way that would be recognizable to college admissions—what the youth participating in Martin, Gutierrez, and Muldoon's study described as "speaking the language of admission" (Martin, Gutierrez, & Muldoon, 2020, p. 20). Youth also reported using alternative digital credentials to reflect on their experiences which they believed helped them speak clearly about their educational goals and reasons for attending college.

Collectively, these studies provided insight into the potential value of alternative digital credentials for supporting pathways into higher education from youth-serving afterschool programs. Admissions officers believe alternative digital credentials have a place in admissions

decisions primarily as a means of bringing more objectivity to the evaluation of hard to quantify soft skills (personal qualities) and for visualizing learning trajectories which admissions officers felt would add valuable context to the application review process (Fishman, Teasley, & Cederquist, 2018) (Pitt, Bell, Strickman, & Davis, 2019). Alternative digital credentials may also provide a means for youth to reflect upon and communicate their college readiness with admissions offices in terms more familiar to application readers (Martin, Gutierrez, & Muldoon, , 2020). To be taken seriously, admissions officers in these studies felt alternative digital credentials need to be accessible to all and used to credential skills that are nontrivial and meaningful to admissions decisions (Fishman, Teasley, & Cederquist, 2018).

What is less understood about alternative digital credentials and college admissions is how admissions officers use information about interests and informal learning experiences to understand an applicant's match with their institution. Integrating alternative digital credentials into the existing admissions infrastructure also requires a better understanding of the skills that informal learning experiences signal and which of these skills are considered "meaningful" to admissions officers. Finally, additional research is needed to better understand the value of "speaking the language of admissions officers" to admissions officers themselves.

### *2.2.4 Learning ecosystems: Supporting learning across formal and informal contexts*

This dissertation also draws inspiration from the Chicago City of Learning that utilized an Internet-based platform known as STEAMville to connect learning across different contexts (Barron, Gomez, Pinkard, & Martin, 2014). The Chicago City of Learning is one example of how technology can support connected learning (Ito, et al., 2013), the framework for learning that emerged from MacArthur's digital media and learning projects. The objective of the connected learning movement is to support youths' movement along learning pathways (such as

pathways into higher education) using digital and networked technologies. For example, the Chicago City of Learning employed three different types of infrastructure to connect learning across contexts: 1) soft infrastructure—learning opportunities and intended outcomes for youth and family, 2) an information infrastructure—credential issuing platforms, online social networks, frictionless data collection, and visualization tools, and 3) hard infrastructure—transportation systems, community hubs, and funding (Pinkard, 2019). Using the Chicago City of learning platform (STEAMville), youth are able to search for and find learning opportunities offered throughout their city that match their interests.

The theory of connected learning is not new but rather builds off of existing sociocultural models of learning such as Bronfenbrenner's ecological model of human development (1977) and Lave and Wenger's communities of practice (1991). Each theory characterizes learning as boundary-crossing and stemming from social activity. Learning occurs within and across different contexts, both formal and informal, and is demonstrated through active participation within communities of shared interest. Development is represented by the individual's increased participation within different learning contexts and communities of practice as skills and interests develop. The connected learning movement emphasizes that people are more likely to persist with learning and seek out new opportunities when engagement is embedded in interest-driven activities, supported by peers and mentors, and aligned with academic, civic, and career goals (Ito et al., 2013, p. 62).

The ability for credential issuing platforms such as STEAMville to capture data on the location and availability of learning opportunities offered across a city has opened new opportunities for influencing policy around informal learning opportunities by making it possible to represent where opportunities are located across the city. Informed by her work with the

Chicago City of Learning project, Nichole Pinkard (2023) put forth the concept of *opportunity landscaping* as "a hyperlocal ecosystem approach to supporting communities in visualizing and tuning their learning infrastructure to provide the learning places, spaces, resources, caring adults, and peers to nurture healthy STEM identities and lifestyles for youth and families living in historically disinvested communities" (np). One early example of *opportunity landscaping* by Quigley, et al., (2016) used data on the availability of different extracurricular opportunities within Chicago to develop heatmaps to convey informal learning program richness, abundance, and evenness throughout different neighborhoods. Richness describes the diversity of different types of opportunities. Abundance describes the total number of opportunities available within a given community while evenness considers both the total number of activities available and the degree to which these opportunities are redundant.

An important component of *opportunity landscaping* is the inclusion of community member input. *Opportunity landscaping* is a participatory design process (Muller, 2022) meant to empower community members to imagine what is possible by understanding how discriminatory policies have shaped their communities. For example, in another *opportunity landscaping* project Erete, Dickinson, Martin, Bethune, and Pinkard (2020) used geospatial technologies and input from members of a Chicago neighborhood to map both the structural and social barriers to learning opportunities within their community The results produced a community map that made visible both the degree to which access to learning opportunities is restricted in terms of the availability of learning opportunities within a 10-minute walk of the neighborhood and incidence of crime along the routes to those opportunities. This approach allowed researchers in partnership with community members to communicate how both the built and social ecology of a landscape both support and impinge upon opportunities to learn.

More recently Pinkard, Erete, Caitlin, Majors, and Walker (2025) introduced the "grammar" of *opportunity landscaping*—different dimensions and sub-dimensions of soft infrastructure and hard infrastructure of informal learning. The grammar includes information about the locations where youth-focused learning opportunities are offered such as the availability of classroom and outdoor spaces for learning; the people and organizations involved in providing the learning opportunities include the purpose and values of the provider organizations; the different opportunities youth have for learning within their communities such as classes, camps, and clubs; and barriers to connection to opportunities such as the history of discriminatory policies that have shaped a community and the availability of public transportation.

While digital badges have not been discussed as a tool for *opportunity landscaping*, they are a potential tool for aggregating information about informal learning opportunities at scale. Having processes for documenting and representing the health of a learning ecosystem through digital badge metadata may be a powerful tool for contextualizing extracurricular engagement. A potential limitation to this approach is the question of how to incorporate community input into the process as it scales.

### 2.3 Conclusion: Looking ahead—Skills for the Future and the Mastery Transcript Consortium

In this chapter, I have reviewed the different criteria used to determine an applicant's merit for admission to higher education. When conducting a holistic review of an applicant's application, a college admissions officer will almost always consider the applicant's academic achievement but may also consider factors that go beyond predicting academic achievement such as the applicant's life experiences and personal qualities, which are often associated with an

applicant's informal learning experiences and interest-driven learning. The consideration of a broader array of college readiness indicators is supported by the argument that including these indicators in the admissions process will broaden access to higher education. There is good reason to believe this is possible: a new admissions tool from the College Board, the Landscape dashboard, provisions consistent and reliable information about applicants' schools and neighborhood context and has been shown to increase access for low-income applicants in experimental studies (Bastedo & Bowman, 2017; Bastedo, et al., 2022). Unfortunately, as my review has discussed, it is questionable whether tools like the Landscape dashboard are sufficient for increasing access when academic criteria remain the primary means for evaluating fit with an institution. Alternative digital credentials have emerged as a potential tool for increasing access to higher education. Alternative digital credentials are flexible and transparent tools for representing informal learning experiences in college admissions. Much has already been learned about their potential use in admissions. Admissions officers believe alternative digital credentials might make important learning outcomes more visible while adding additional context to the review process (Pitt, Bell, Strickman, & Davis, 2019). Youth believe alternative digital credentials can increase access to higher education by helping them better understand their own skills and, more importantly, how to communicate these skills in a manner that is meaningful to admissions officers (Martin, Gutierrez, & Muldoon, 2020). While alternative digital credentials are believed to have great potential for improving college access, little is known about how they would work within existing admissions practices.

For alternative digital credentials to become part of the college admissions infrastructure more research is needed to understand how informal learning is currently understood by admissions officers, how they come to learn about it, and how they make informed admissions

decisions using it. More specifically, how might alternative digital credentialing tools such as the Mastery Transcript improve the representation of informal learning? What information should be included in the Mastery Transcript? Should it include examples of student work? If so, how do college admissions personnel make judgements about the validity of student work for demonstrating nonacademic factors? If tools like the Mastery Transcript are used to provision information about extracurricular learning, how will this information be contextualized and what is the potential for perpetuating inequality in college admissions? How might participatory processes like *opportunity landscaping* add additional context to the evaluation of alternative digital credentials?

In the following chapters I present a study designed to answer my two research questions: How do college admissions personnel utilize information about students' informal learning to make admissions decisions? And how might alternative digital credentials such as the mastery transcript and concepts like *opportunity landscaping* improve the legibility of informal learning in application review processes? The *Skills for the Future* initiative is likely to increase interest in using alternative digital credentialing tools to represent informal learning in college applications. Ensuring that these tools are employed equitably requires understanding how they are likely to be employed and work with existing materials. Through semi-structured interviews with twelve college admissions officers, I examine the existing materials used to understand informal learning, the signals admissions officers look for when evaluating these materials, and how this information is used to make admissions decisions. I also examine how alternative digital credentials might be employed to improve the legibility of informal learning in the admissions process.

# Chapter 3

## Research Methodology

Research on college admissions materials and application review procedures within the United States, specifically holistic review procedures that consider a portfolio of evidence to determine college readiness beyond predicted academic performance, often examines how the reliance on academic factors persistently and significantly perpetuate imbalances in the equitable representation of racially minoritized students and students of low socioeconomic status. Other work has examined inequities in access to resources for planning college applications, finding them less available at high schools and within families of the lowest income and predominately within racially minoritized communities. Prior research has also approached these questions by examining the materials used in holistic admissions decisions: predominately those that inform the evaluation of academic factors or provide additional context for a comprehensive review of the applicant's background. For instance, Bastedo and Bowman (2017), and later Nicola (2022), found high school profiles of highly resourced secondary schools submitted with official academic transcripts typically contain significantly more detail about a high school's curriculum and the average academic performance and educational outcomes of its students. This allows college admissions professionals to better situate applicants' achievement within their own learning environments. The objective of the study described in this dissertation is to understand whether college admissions officers perceive similar information inequalities in the context of evaluating evidence of informal learning, specifically evidence of extracurricular engagement

and broader experiences and personal qualities. This study is guided by the understanding that interpreting these types of factors is complicated by a lack of tools for documenting and communicating information about informal learning environments. Informed by other studies that have developed methods for provisioning data within college admissions (Bastedo, et al., 2022) this study explores strategies for employing alternative digital credentials as another potential tool for addressing this problem.

### 3.1 Study Design

This dissertation is part of a larger researcher project known as the Mastery in Out-of-School Time (MOST) research project that sought to define design specifications for a comprehensive learning record (CLR) that youth could use to document and communicate information about their informal learning experiences (Fishman, et al., 2023). The project incorporated insight into the design of a CLR through interviews with stakeholders likely to use it. The study described in this dissertation focuses on understanding the information needs of one stakeholder group: college admissions officers.

Alternative digital credentials are useful for capturing and reporting on informal learning outcomes and learning across contexts (Grant, 2014). However, the literature that has examined the use of digital credentials in applicant selection scenarios has primarily focused on gauging the *potential* value of digital credentials to applicant selection from the perspective of producers and consumers of digital credentials. Prior work has typically addressed perceptions of potential use without providing details on issues of implementation. To address this gap, I designed this study to accomplish two goals. The first is to examine the perspectives college admissions officers have of learning experiences outside of school. The second is to use these findings to make recommendations for improving the legibility of informal learning experiences and

nonacademic outcomes through the use of alternative digital credentials. I aim to use the findings discussed in this study to provide practical insight into how alternative digital credentials should be designed to increase their chance of becoming part of the college admissions infrastructure.

### *3.1.1 Research questions*

The study followed a pragmatic research design (Kelly & Cordeiro, 2020, p. 2) to help both researchers of alternative digital credentialing systems and college admissions professionals understand the application review process. It is pragmatic also in the sense that I intend for the findings to provide insight into persistent problems of the application review process. As discussed above, this study explores how college admissions personnel make sense of and use evidence of informal learning such as extracurricular engagement, personal qualities, and broader life experiences as part of a holistic review of college application materials. The goal of the study is to improve the legibility of this type of learning through the use of alternative digital credentials. The study is guided by two research questions:

1. How do college admissions personnel utilize information about informal learning experiences as part of their holistic review of college applications?
2. How might alternative digital credentials improve the legibility of informal learning in application review processes?

The study proceeded in two phases of data collection which I discuss in more detail below after my presentation of informants and the methods employed to sample them. This is followed by an overview of the data collection and analysis process, including sampling procedures for both phases of data collection. I conclude the chapter with a discussion of data quality and a look ahead to the remaining chapters.

### *3.1.2 Informants*

To answer the study's two research questions, I used snowball sampling (Parker, Scott, & Geddes, 2019) to recruit twelve (n=12) college admissions personnel, also referred to as application readers in this dissertation, to share their respective experiences reviewing college applications (see Table 1 for a complete list of informants and informant institutions). I used three criteria to sample informants.

1. Informants must have been employed by one of the following institution types: public comprehensive, liberal arts, or private comprehensive.
2. Informants must have experiences as a full-time application reader.
3. Informants must have worked as an application reader after the 2020 admissions cycle.

The first criteria required all informants to have experience reviewing applications to four-year bachelor's degree programs as opposed to a two-year associate's or graduate programs. I also sampled informants based on the type of institution that employed them. Informants for this study each individually represented one of three related but distinct four-year institution types: public comprehensive (n=5), private comprehensive (n=3), and private liberal arts colleges (n=4). I chose to recruit from these types of institutions because I understood that admissions processes and priorities are in part shaped by both the selectivity and control of the institution (public versus private) (Hossler et al., 2019). This simplified the reporting of findings by ensuring informants had comparable experiences and that findings could be framed in relation to their unique purpose and constraints.

There are also important points to clarify about the representation of three particular institutions in this study. Two informants, Peter and Noelle, both work for the same institution. However, as shown by their responses, each provides their own distinct perspectives on college

admissions. Finally, one informant, Gordon Lister, often compared his experiences working in admissions at both a highly selective liberal arts college (Cerreta College) and a highly selective private comprehensive institution (Robinette University). As such, both institutions are included in the list of institutions represented in this study.

My second criteria required informants to have worked full-time reading applications as opposed to having worked part-time or as seasonal staff supporting application review. This also increased the likelihood that informants had engaged in the responsibilities of full-time college application personnel member including, but not limited to, recruiting and counseling prospective students and parents, collaborating with high school counselors, and reading applications. While personal experiences are not "application materials" in and of themselves, Stevens (2009) has found they serve as valuable information channels for communicating highly personalized information about applicants.

My third and final criteria required informants to have last worked as application readers no earlier than the 2020 application cycle. This helped ensure both the timeliness and relevance of my findings to the current state of college admissions and broaden my recruitment pool to allow for informants who had since left their position by the time of the start of the study in 2022. I now discuss the selectivity of the institutions that employed the study's informants.

Table 1. Informant and institutional pseudonyms.

| *Informant Pseudonym* | *Institutional Pseudonym* | *Institutional Control* | *Selectivity* |
|---|---|---|---|
| **Peter Jackson *†** | Carmichael University | Public Comprehensive | Highly Selective |
| **Noelle Cassidy *** | | | |
| **John Green *†** | Skoda State University | Public Comprehensive | Selective |
| **Bill Alton †** | Cabot City University | Public Comprehensive | Access-driven |
| **Kayla Smith †** | University of Logan County | Public Comprehensive | Selective |
| **Ada Wallace** | Van Buren University | Public Comprehensive | Access-driven |
| **Michael Lucas *†** | Old Stone College | Liberal Arts | Highly Selective |
| **Marvin Emory *†** | Hill College | Liberal Arts | Highly Selective |
| **Olive Wesley †** | Briscoe University | Liberal Arts | Selective |
| **Gordon Lister *†** | Cerreta College | Liberal Arts | Highly Selective |
| | Robinette Polytechnic | Private Comprehensive | Highly Selective |
| **Norah O'Brian *†** | Benson University | Private Comprehensive | Highly Selective |
| **Aaron Rodric †** | University of St. Olivet | Private Comprehensive | Selective |

***** *Indicates Phase II informant*

† *Indicates managerial role*

### *3.1.3 Institutional selectivity represented among informants*

Following other studies of holistic review in college admissions (Bastedo et al., 2018; Hossler et al., 2019) I use *Barron's Selectivity Index* (NSCRC, 2021) to classify and discuss the institutions that employed the informants represented in this study. The index includes four institutional selectivity categories:

1. Highly selective: Admitting fewer than a third of all applicants
2. Very competitive: Admitting between 50% [expanded to 40%] and 75% of applicants
3. Competitive: Admitting between 75% and 80% of applicants
4. Less selective: Admitting all that meet academic requirements

To simplify the reporting of findings I collapsed the second and third indices of very competitive and competitive into one category of "selective" institutions and expand the range of selectivity

to also include institutions that admit approximately 40% of applicants. Finally, wanting to avoid deficit framings, I utilize the term "access-driven" when referring to the category of less selective institutions. The connotation of "less" implies that something is lacking from these types of institutions when in fact they are purposefully designed to be open and accessible to all.

Considered together, the selectivity of the twelve institutions in this study ranged from the most selective institution admitting fewer than 10% of all applicants in 2022 to the most open institution admitting nearly 95% of all applicants. The most selective institutions also appeared to receive the largest number of applications, a notable bottleneck in the application review process. For instance, of the six institutions represented in this study that received a minimum of 10,000 applications in 2022, only two admitted more than a third of their applicants. Of those institutions that received fewer than 10,000 applications, the most selective tended to be private liberal arts colleges.

In the next two sections I discuss data collection and analysis procedures for each of the two phases of the study. A flowchart representing the different steps of each phase and the connection between the two phases is presented in Figure 1. Each step in the figure is numbered according to the sequence in which it occurred.

### 3.2 Data collection and analysis

I explored the following research question in Phase I: How do college admissions personnel utilize information about students' informal learning to make admissions decisions? I followed a semi-structured interview protocol to guide one-on-one interviews with college admissions officers. Interviews lasted approximately one hour to one and a half hours each. All meetings were audio and video recorded using a video-conferencing platform. Below, I detail

how I developed the interview protocol for Phase I and how informant sampling proceeded. I also go into more detail about my data collection and analysis procedures.

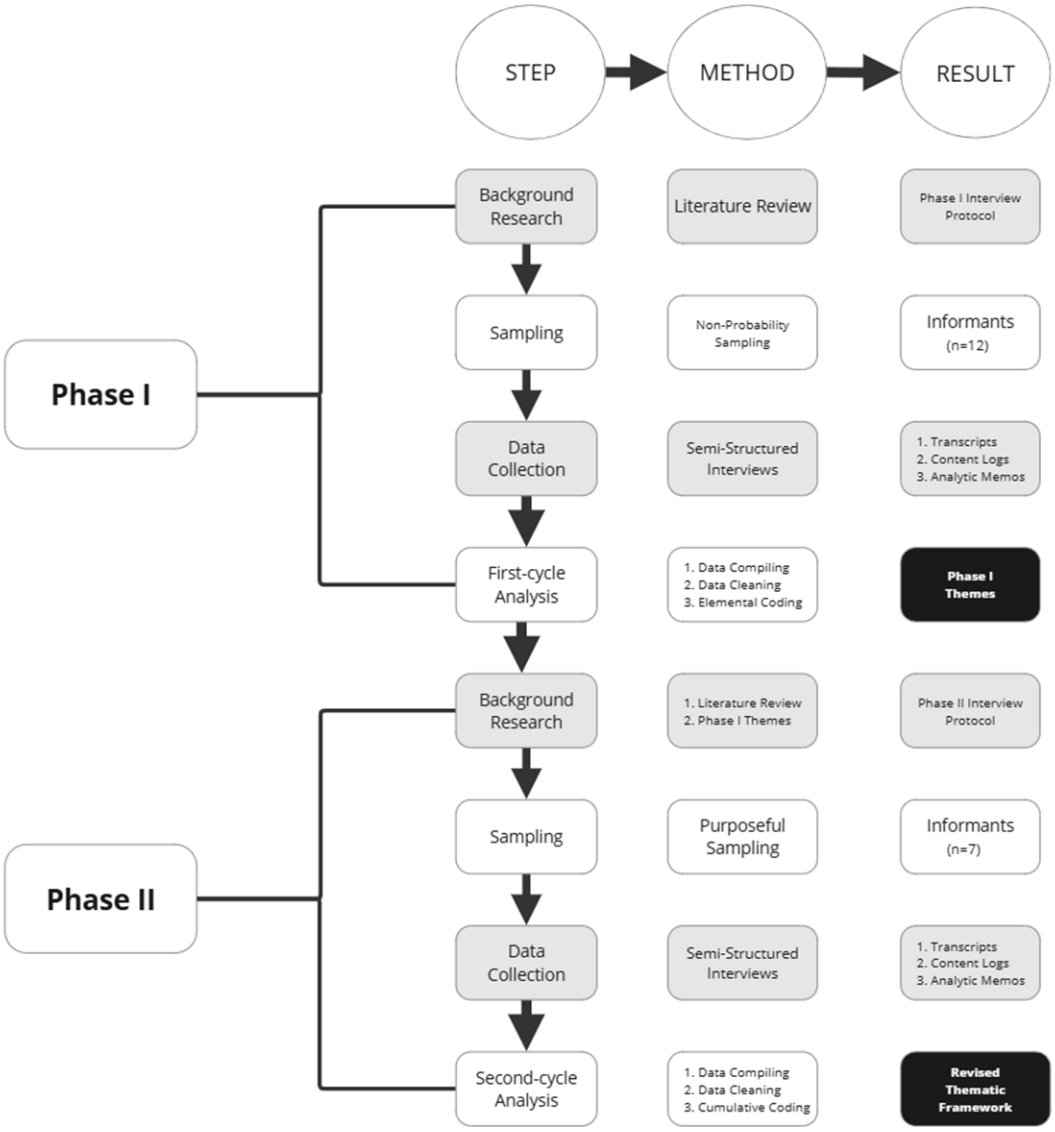



Figure 1. Flowchart for data collection and analysis Phase I & II.

### *3.2.1 Phase I background research*

Starting in the winter of 2022, I reviewed literature on studies related to college application review processes and materials, the organization of informal learning, and issues specific to STEM admissions. I used this background research to develop a semi-structured interview protocol focused on these three topics plus two current events at the time, the COVID-19 pandemic and the protests in response to the murder of George Floyd in 2020. I added new questions to the protocol as they emerged from interviews. While I added many useful sub-questions throughout the study, no new topics emerged after the second interview. See table 2 below for the complete Phase I interview guide.

### *3.2.2 Phase I sampling procedure*

Recruitment for Phase I began in the Winter of 2022 and concluded in the Fall of 2022. I began with recruiting two informants within my social network: Peter Jackson and John Green (all names used are pseudonyms). Peter Jackson and John Green are acquaintances of each other, and both are experienced enrollment management officers (offices of admissions, financial aid, and registration combined). Both are advanced in their careers and have an extensive professional network in college admissions. Using the sampling criteria which I outlined above, Peter and John compiled an initial list of ten candidates for participation in the study. They then sent individualized invitations to these ten candidates to gauge initial interest in participating in the study. A detailed description of the study was included in their request.

Between Peter and John, I received a positive response from five candidates, including Peter and John themselves. With this list in hand, I contacted each candidate by email formally requesting their participation in the study (including emails to Peter and John) to obtain consent forms (see Appendix A for email). In each email I detailed the objectives of the study and

described how interviews would proceed. I also described how interviews would occur, including an option to participate in a second interview as part of Phase II. Each email included a consent form for candidates to review, sign, and return to me if they chose to participate in the study. Once a candidate agreed to an interview, I scheduled a meeting for one hour at the informant's earliest convenience.

By the end of the summer of 2022, I had completed interviews with each of the initial five informants but only collected data from four; one informant failed to submit a consent form resulting in the exclusion of this data from the study. Wanting to grow my population of informants and diversify the selectivity and types of institutions represented in the study, I asked another colleague within my network with contacts in college admissions for assistance with recruitment. This colleague connected me to four new candidates. Of these four, I interviewed three. Using snowball sampling with this group of three, I recruited and interviewed an additional three informants. I recruited an additional informant through a direct message to an admissions officer within my extended LinkedIn social network that met my sampling criteria. Using a private channel, I described the project to this recruit and requested an interview. After collecting the proper consent form and conducting the interview with this informant they connected me to my twelfth and final informant. I made the decision to conclude sampling with twelve informants because no new topics had been added to the interview protocol since the second interview, and I felt I had reached a representative sampling of institution types.

### *3.2.3 Phase I data collection procedures*

I conducted interviews using a video-conferencing platform. Each interview began with the informant telling me about themselves and their role (either former or current) in college admissions. I then asked the informant how they and their institution identify promising

applicants. The purpose of this question was to establish the specific materials collected by the respective institution and the criteria used to evaluate the materials. I then asked informants to discuss whether or not they are allowed to accept and review "non-standard materials" as part of their review process. I explained that non-standard materials meant materials that were not required for review but might be submitted by students outside the normal application channels. This allowed me to explore one affordance of alternative digital credentials within the context of college admissions, their ability to communicate examples of student work. Follow-up questions asked for the informant's perspective on the parts of the application that they feel are particularly important for making admissions decisions. Following this, I transitioned into a series of questions about informal learning experiences.

I began my line of questioning about informal learning by asking informants to discuss examples of these experiences commonly seen in applications and where they typically learn about these experiences in the application. Throughout this conversation informants were encouraged to discuss when and why this information has made a difference in admissions decisions if at all. To address the topic from a different angle, I asked informants if they had a process for identifying and evaluating personal qualities deemed important to success at their institution. To help informants reflect on this question, I provided examples such as collaboration, leadership, and communication. I encouraged informants to discuss any additional personal qualities or other nonacademic factors they deemed important to success. Finally, I asked informants how they read application materials to develop impressions of fit with their institution. This opened the conversation to a broader discussion of how admissions officers read between the lines of different application materials as a way of developing a more holistic view of a student's background and experiences.

It should be noted that the topic of alternative digital credentials often came up during Phase I interviews despite not including a protocol question specifically about them. This occurred as a result of introducing the overarching research objective to informants at the beginning of each interview. It also often arose during conversations about personal qualities like leadership and teamwork and their significance to student success.

Table 2. Phase I interview guide.

| Topic | Interview Questions | Purpose |
|---|---|---|
| Holistic Review / Admissions Procedures | ● What goes into a student's application file?<br>● How many applications do you receive / admit?<br>● How do you read a typical application?<br>● How much time do you have to read an application, generally?<br>● What parts of the application are most important?<br>● Do you ever accept "non-standard" materials from applicants (e.g., materials not part of the Common Application)? What kinds of things does this include? When would you typically accept them?<br>● What helps an applicant rise above the rest of the pool?<br>● Are there common things that lead to someone being "ruled out" early in the review process?<br>● What are some things that lead to an applicant being a "must admit" - beyond the idea of "being admissible." | To learn about…<br>● Admissions criteria used by each informant<br>● How applicants are evaluated using these criteria<br>● Informant perspective on "ideal" candidates |
| Informal Learning | ● Are there some kinds of information about out-of-school learning or activities you find more or less useful or compelling than others?<br>● How might evidence from students' out-of-school experiences give you information about "fit" with your school or support your work to build a class?<br>● If there were an unknown out-of-school program provider, what would you want to know about them? What would give you confidence that completion of the program is an indicator that students are prepared for your institution?<br>● For applicants who may not be strong by traditional academic measures (GPA, test scores), are there attributes or information you look for that might keep them under active consideration?<br>● How do you think about so-called *Skills for the Future* (i.e. personal qualities) as part of your assessment of an applicant's readiness for college?<br>● Are you deliberately looking for them? Where / how do you find them?<br>● Can an applicant having these skills make up for lack of traditional academic accomplishments? | To learn about…<br>● Role of informal learning<br>● Common signals of informal learning<br>● Outcomes of informal learning |
| STEM Admissions | ● We'd like to talk directly about how you might look at an applicant's potential in STEM (Define STEM - Science, Technology, Engineering, or Math) areas.<br>● What kinds of evidence do students currently submit related to STEM preparation or engagement?<br>● Imagine that you had "perfect" information about an applicant's potential – at least for STEM learning – from their out-of-school activities. What would that information consist of?<br>● Do you have wiggle room to admit a student even if they may be missing some academic requirements?<br>● How might you consider that information alongside the traditional academic record? | To understand…<br>● The structure of STEM admissions<br>● How/if standards of admission shift with STEM admissions |
| COVID-19; Social Justice | ● Have recent events, e.g., the pandemic or calls for racial justice, changed the way you think about different elements of your admissions process?<br>● Post-Covid, will you retain practices adopted during Covid? Why or why not? | ● To explore reactions to external pressure |

### *3.2.4 Phase I data analysis*

The primary source for Phase I data analysis were the interview transcripts automatically generated by the video-conferencing platform used to conduct interviews. Following each interview, I manually corrected errors in each transcript and anonymized the transcript by replacing the informant's name and their institution's name with pseudonyms. For each interview, I wrote a content log immediately following the interview. The writing of content logs is a technique for annotating data and documenting the researcher's initial reaction to an interview or participant observation. Following Jordan and Henderson (1995), I wrote each content log as a time-stamped summary of the informant's responses to each protocol question. Time stamps helped later in the study when selecting quotes to support findings. I discuss the use of content logs as a data source in more detail below.

Phase I data analysis proceeded through two coding cycles. I first coded transcripts using elemental coding methods at both the paragraph and sentence level. Elemental coding methods are useful for initial reviews of a corpus of data for the purpose of developing a foundation for future data collection and analysis (Saldaña, 2021).Specific elemental coding methods employed in the first cycle included structural, *in vivo*, process, value, and concept coding. Structural codes referred to informants' responses to specific protocol questions. This helped me quickly compare and contrast the responses to each protocol question across all interviews. I used *in vivo* codes to label segments of data using the exact words used by the informant. Process codes referred to specific procedures informants reported using to evaluate application materials. Value codes reflected informants' attitudes and beliefs related to admissions criteria, materials, prospective students, and admissions as a field more broadly. Finally, concept codes reflected macro-level ideas. Like *in vivo codes*, concept codes reflected responses that were particularly insightful. The

first coding cycle produced a codebook. As I developed codes I added them to a master codebook, a Microsoft Excel spreadsheet that included the name of each code, a brief description of each code, related codes, and selected quotes. I also maintained a codebook in Dedoose qualitative coding software. Dedoose simplified the coding and organization of transcripts. However, the master codebook served as the final and complete record for codes. A table of the most frequently used codes is presented below in Table 3. Definitions for these codes with exemplar quotes is available in Appendix B.

In the second cycle of Phase I data analysis, I generated preliminary themes from an analysis of Phase I codes. I began by mapping related codes into themes reflective of overarching patterns and relationships between different concepts, processes, and values described by the informants. I started by organizing structural codes (those associated with specific protocol questions) into an Excel spreadsheet for each informant. In each spreadsheet, I used content logs to summarize the informant's responses to each protocol question and to document the codes associated with each response along with associated keywords. This produced a preliminary list of themes related to each interview topic: documenting responses with keywords helped with this process. Once I had a preliminary list of themes, I reduced them into a list of three which I used to develop my interview protocol for Phase II, which I detail in the following section. In Phase II, I explored my second research question in more detail: How might alternative digital credentials improve the legibility of informal learning in the application review process? As discussed above, I used preliminary Phase I themes as a framework for developing my interview protocol. I designed Phase II data collection to elaborate and dive deeper into these themes which I discuss in detail in the next section while also situating them within the context of alternative digital credentials.

Table 3. Most commonly used codes by frequency.

| Code | # | Definition of code |
|---|---|---|
| Signals of fit | 269 | Any reference to signals used by to predict the academic and cultural/social success of the applicant at the institution. |
| Contextualizing informal learning | 263 | Any reference to admissions officers situating informal learning within the context of the applicant's home or community. |
| Holistic Review | 101 | Any specific reference to the holistic review process. |
| Academic fit | 99 | Any reference to standardized materials and criteria and how they are used to contextualize achievement |
| Nonacademic fit | 88 | Any reference to the broad category of personal qualities that includes qualities like leadership, perseverance, and teamwork. |
| Relationality | 67 | Any reference to relationships between admissions offices/officers and secondary schools, community-based organizations (OST Orgs), or secondary-school students. |
| Essays | 55 | Any reference by admissions officers about applicant essays - either their use in applicant evaluation and/or their perspective on what makes a quality essay. |
| Maximizing Opportunity | 36 | Any reference to achievement/potential as students taking full advantage of the opportunities afforded to them. |
| COVID-19 | 34 | Any reference to the COVID-19 pandemic. |
| Access to learning resources | 32 | Any reference to how ecological factors impact access to academic assets like informal science learning, sports, and supplemental academic content. |
| Standard materials | 30 | Any reference to standardized criteria used to contextualize achievement. |
| Digital credentials | 29 | Any reference to the admissions personnel's perspective on the value and trade-offs of adopting alternative digital credentials into their admissions process. |
| Institutional priorities | 26 | Any reference to strategic goals or admissions priorities established by institutions or the strategies put in place to achieve the goals. |
| Substantive engagement | 21 | Any reference to the quality of an applicant's engagement and commitment to a particular interest. |
| Rules applicants out | 17 | Any signal from an application that may lead to denying admission. |
| Perseverance | 15 | Any reference to perseverance as a personal quality. |
| Corroboration | 14 | Any reference admissions officers make to the processes of verify statements applicants make in their applications |
| Direct admit STEM | 14 | Any reference to direct admit programs (typically professional schools and colleges such as engineering or business). |
| Non-standard materials | 14 | Any reference to atypical admissions materials submitted by students such as examples of their work. |
| Training | 13 | Any reference to training and its role in shaping holistic admissions. |
| Academic-Career Goals | 10 | Any reference to an applicant's academic and career goals that helps contextualize academic factors. |
| College Board Landscape | 7 | Any specific mention of using the College Board Landscape dashboard as a tool for contextualizing applications. |
| Leadership | 6 | Any reference to leadership as a personal quality |
| Reflection and meaning making | 5 | Any reference to reflection or meaning making on informal learning experiences as a nonacademic signal of college readiness. |

### *3.2.5 Phase II background research*

The themes chosen for Phase II included personal qualities and their significance to student success, challenges and procedures for evaluating personal qualities, and issues related to how informants consider a student's opportunity to engage in extracurricular activities (see Table 4 for the Phase II interview protocol).

I selected these themes because of their relevance to research question one: How do college admissions professionals use informal learning in their application review process? For instance, preliminary findings from Phase I data analysis suggested informants think of applicants' personal qualities like leadership and perseverance and extracurricular activities both inside and outside of school when they think about informal learning. This suggested that "informal" means more than just learning outside of school to college admissions officers. They reported looking for evidence of applicants' personal qualities in qualitative application materials to understand an applicant's different personal qualities. To extend these findings, I developed protocol questions to examine how admissions officers define personal qualities and their processes for validating them using the existing tools available to them. Informants also often spoke about the importance of contextualizing students' extracurricular activities, but it was still unclear exactly how this process applied to opportunities outside of school or if it did at all. For this reason, I chose to ask additional questions about how informants consider opportunity to engage in informal learning activities in Phase II. Alternative digital credentials fit into this framework of preliminary themes quite naturally given their affordances for documenting and reporting a range of college readiness factors and general usefulness for capturing and communicating data about learning and learning contexts (Fishman, Teasley, & Cederquist, 2018).

To develop the Phase II interview protocol, I first reviewed literature on the use extracurricular engagement and personal experiences in college admissions as well as literature about alternative digital credentialing. I added new questions to the protocol as they emerged from interviews. I finalized the protocol by the fourth interview. While finalization of the Phase II protocol occurred relatively late compared to Phase I, the themes of inquiry never changed. I primarily refined the wording of the questions and added useful sub-questions to improve their clarity.

Table 4. Phase II interview protocol.

| Theme | Interview Questions | Purpose |
|---|---|---|
| Personal qualities and their significance to student success | Conversational Prompt - Informants are asked to sort ten PQ by their significance to student success while considering the following:<br>● What are the sources of information?<br>● Why do you look for these outcomes?<br>● Why might you not look at other outcomes? | ● To validate PQ used in admissions<br>To understand . . .<br>● Sources of PQ information<br>● Reason for using PQ in admissions<br>● Distinctions drawn between PQ |
| Challenges and procedures for evaluating personal qualities | Conversational Prompt - Informants are asked to discuss the quality of information available to understand NAF while considering the following:<br>● Why are some nonacademic factors more difficult to evaluate than others?<br>● How might digital microcredentials support the evaluation of nonacademic factors? (Mastery Transcript prototype shared)<br>● How does the source of a credential impact the trust placed in the credential? | To understand . . .<br>● The role of verification in PQ evaluation<br>● The opportunities and limitations of verifying PQ<br>● Issues of trust in reporting PQ |
| Extracurricular opportunity: Contextualizing informal learning opportunities (categorical theme) | Conversational Prompt - Informants are encouraged to reflect on a map of OST opportunities offered through Chicago's summer learning program while considering the following:<br>● What tools and criteria do you consider when evaluating extracurricular opportunities?<br>● How do you apply these tools to learning about informal learning opportunities? | To learn . . .<br>● How extracurricular opportunity is defined<br>● How informants evaluate achievement in informal learning in light of extracurricular opportunity |

### *3.2.6 Phase II sampling procedures*

To recruit informants for Phase II, I contacted each Phase I informant individually by email to ask about their availability for a second interview. I reminded the informant that the interview was optional, that it would revisit themes from their first interview, and that it would include specific questions regarding the potential use of alternative digital credentials in application review processes. I received a positive response from seven of the original twelve informants. Of the remaining five informants, one indicated they were unavailable for a second interview while the remaining four never responded to my request. The seven informants who participated in the second round of interviews each represented highly selective or selective institutions, and each indicated they consider a portfolio of materials as part of their review process as opposed to a formulaic approach for admitting students using academic factors usually reported by informants from access-driven institutions. While this means the absence of insight from access-driven institutions in the second phase, because I discussed alternative digital credentials in Phase I interviews, all informants had an opportunity to share their perspective on them, often in great detail. When and where possible I include these Phase I discussions about alternative digital credentials in my Research Question 2 findings and discussion.

### *3.2.7 Phase II data collection procedures*

The first topic of Phase II interviews addressed questions related to interpreting personal qualities about applicants and their significance to student success. In order to have more consistent data across the different interviews, I selected ten personal qualities frequently mentioned by the informants in Phase I to use as a conversational prompt. To define each, I cross-referenced my list of ten personal qualities against the *Skills for the Future* taxonomy of 30 skills. Each of the ten personal qualities used in Phase II interviews were represented in the *Skills*

*for the Future* taxonomy. This gave me additional confidence that focusing on these personal qualities in the second phase of data collection was appropriate. The ten skills included both cognitive and noncognitive skills: critical thinking, problem solving, leadership, communication, advocacy, self-management, empathy, perseverance, awareness, and a sense of belonging. I also requested and received a PDF copy of the Mastery Transcript from The Mastery Transcript Consortium that I was able to share with Phase II informants. This allowed me to point out features and affordances of the Mastery Transcript as we discussed the challenges of interpreting personal qualities through existing application materials.

I began each interview by prompting informants to rank the list of ten personal qualities by the informant's perception of each quality's significance to success at their institution. I asked informants to think about the source of information for each skill and why they might (or might not) look for the factor in an application. This helped me develop a deeper understanding of how college admissions professionals read and make meaning about subjective characteristics from application materials. It also helped me understand how college admissions officers draw distinctions between different types of nonacademic factors in terms of their value to student success or their legibility in the application.

Next, I asked informants to discuss how they verify and validate personal qualities with the information available to them. In Phase I, informants frequently spoke about the ways in which they tried to verify the authenticity of student claims. They often described a process of corroborating information across application materials. This allowed me to discuss how alternative digital credentials could help with verification and validation of personal qualities with informants. This line of questioning was informed by Donath's (2007) use of signal theory (Spence, 1973) and warranting theory (Walther & Parks, 2002) to explain how individuals draw

on different types of signals, or cues, to evaluate self-presentations online, such as those found on dating sites. Trust in an online presentation increases as the perceived cost of minipulating the signals it communicates increases. My line of questioning examined why some personal qualities might be more challenging to evaluate than others based on the source of a typical signal of the personal quality. This allowed me to discuss how alternative digital credentials might help address some of these challenges with informants. To help informants think about how alternative digital credentials might help in the evaluation of personal qualities, I shared the PDF copy of the Mastery Transcript (Appendix C) at this point in the interview. I also explained how alternative digital credentials are designed to communicate information about student learning. From these questions I develop a deeper understanding of the opportunities and limitations of incorporating new information into the application review process.

I concluded the interview by asking the informants to share how they consider an applicant's opportunity to engage in extracurricular activities with the information they have available to them. To encourage discussion, I showed informants a Web-based dashboard that displays a map showing the location and density of extracurricular activities in the city of Chicago. The map itself comes from Nichole Pinkard's work on *opportunity landscaping* a method for reimagining learning ecosystems by mapping and visualizing a community's existing educational and employment resources (Pinkard, 2023; Appendix D). When reviewing the map, I asked informants to reflect on what they saw. I purposefully drew their attention to the density of extracurricular activities in different neighborhoods, differences in the types of activities offered from neighborhood to neighborhood, and the proximity of extracurricular opportunities to public transportation. I also encouraged informants to discuss the tools and criteria they currently use to contextualize achievement in extracurricular opportunities and to compare this to what they saw

in the map. My objective here was to learn how informants conceptualize extracurricular opportunity, their reaction to novel forms of representing opportunity, and how an understanding of opportunity shapes their interpretation of achievement outside of school.

### *3.2.8 Phase II data analysis*

Like Phase I, the data source for Phase II were interview transcripts and the content logs written immediately following interviews. Phase II also consisted of two coding cycles. Each cycle utilized cumulative coding, a method of analysis that builds off of related work to reveal comprehensive patterns of meaning (Saldaña, 2023, p. 362). In the first coding cycle, I used elaborative coding methods to refine and extend the codes developed from Phase I to analyze Phase II interview data. Saldaña (2021) describes elaborative coding as a useful approach to coding multiphase studies that aim to extend, or elaborate, on findings from one study to the next. My second coding cycle, and the final round of analysis for the entire study, was a pattern analysis of all Phase I and II codes and content logs to identify larger patterns that address my two research questions. I used my codebook and themes from Phase I and II to organize similarly coded passages into an affinity diagram. Affinity diagramming is a common method employed in technology development research used to group data by their affinity, or connection, to each other (Barnum, 2020). I analyzed these data sets to look for meaningful patterns that answered my two research questions. I continued to revise patterns through both pattern reduction (combining related patterns) and pattern expansion (developing new patterns from two or more patterns) (Saldaña, 2021). This process proceeded through multiple cycles of pattern coding until it was decided that developing additional patterns would no longer contribute to the study's findings. Because Phase II included data from Phase I, my discussion of Research Question two is based off of findings from both phases.

An overview of coding methods employed in both phases of the study is presented below in Table 5. In the following section, I discuss issues related to data quality that are relevant to this study. I discuss the various threats to validity, reliability, and generalizability and the steps I took to protect against them.

Table 5. Coding cycles.

| Coding Cycle | Data Sources | Coding Methods | Product |
|---|---|---|---|
| Phase I | • Interview transcripts<br>• Content logs<br>• Analytic memos | Elemental Coding Methods + Code Mapping<br>• **Structural coding**<br>• In vivo coding<br>• Process coding<br>• Concept coding (Values/Pain Points) | Phase I themes<br>Phase II interview protocol |
| Phase II | Ph. I & II<br>• Interview transcripts<br>• Content logs<br>• Analytic memos | Cumulative Coding Methods<br>• Elaborative Coding<br>• Affinity Diagramming<br>• Pattern Coding | Finalized themes<br>Digital credential recommendations |

### 3.3 Data quality

I relied on Egon Guba's *Criteria for Assessing the Trustworthiness of Naturalistic Inquiries* (1981) for the data quality criteria used in this study I present each criterion below in Table 6 along with the criterion's corresponding contribution to trustworthiness and the accepted approach for protecting each criterion against threats to trustworthiness. I then apply Guba's four criteria to the study described in this chapter. The sections are organized by criterion. I grouped and discussed individual criterion based on the similarity of their underlying threats. In each section, I outline the steps taken to promote the trustworthiness of my findings.

Table 6. Data quality criteria for naturalistic inquiries.

| Criterion | Contribution to Trustworthiness | Protection |
|---|---|---|
| Credibility (Internal Validity) | Trust that findings represent what is believed to be true for informants | **Corroboration:** Confirmation of findings derived from data sources |
| Confirmability (Objectivity) | Trust that bias has been minimized | **Bias reduction:** Allows for "insulation" of investigator from interpretations |
| Transferability (Generalizability) | Trust that findings apply to other contexts | **Rich description:** Allows for comparison between two contexts |
| Dependability (Reliability) | Trust that findings can be reproduced | **Documentation:** Allows for tracking and attribution of variance to source |

### *3.3.1 Credibility & Confirmability*

The credibility and confirmability of this study depends on the perception that the findings, as interpreted by the researcher, represent the truth about the study's topics, as reported by the informants of the study. The threats specific to this study included social desirability bias committed by informants and researcher bias committed by me, the researcher. Protecting against these threats required promoting candid responses from informants and incorporating processes for corroborating my findings into data analysis. Below, I discuss specific steps I took to promote both.

***Social desirability bias.*** To help reduce social desirability bias I assured informants that their identities would be anonymous and confidential. Specific steps included allowing informants to pick their own pseudonym (institutional pseudonyms were made by the researcher). I also carefully reviewed direct quotes for additional signals that could possibly give away an informant's identity or institutional association such as an informants' work and life history or names and locations of people and places associated with their institution. Where this context is necessary to support interpretation of findings, appropriate steps were taken to further anonymize the data. Additional steps included the use of categories to discuss selectivity rather

than exact admissions rates which I feared could easily be cross-referenced with information readily available online.

***Corroborating findings.*** To help assure my findings represented the perspectives of my informants and not my own, I sent member-checking letters to all informants and employed a second coder to moderate my codebook. For each informant I wrote a personalized letter that summarized findings from their interview or interviews, depending on whether or not they participated in both phases of the study. Each letter followed the same basic structure. I began each letter with a summary of the informant's background and their roles and responsibilities as reported by them. I then discussed, in as much detail as possible, the procedures they reported using to review applications. I then described how they reported using these procedures to understand academic and nonacademic factors found in the application. For some informants this included my interpretation of problems they reported facing when reviewing specific parts of the application. I concluded each letter with the recommendations I would make regarding the use of alternative digital credentials in admissions based on their institution's approach to admitting students. Conducting a member check allowed informants to confirm or correct findings and to comment on my recommendations. Of the twelve informants, six responded to my member-checking letters. Feedback was overwhelmingly positive with minor points of clarification. Despite only receiving feedback from six informants, I believe there is enough overlap between each informant's letters to assume sufficient corroboration of all findings.

Additional corroboration of my findings came from a second coder who validated my codebook using a subsample of Phase I transcripts. I made my codebook available to the second coder so that they could familiarize themselves with the coding scheme used in the study. We then met to discuss the codebook and to clear up any confusion on the meaning of certain codes.

Next, I provided the second coder with an uncoded transcript from Phase I as a training document. We worked through this training document together allowing myself and the second coder to indicate where, when, and why we would apply a specific code to a segment of text. After training, I provided both the second coder and myself with three separate, uncoded Phase I transcripts. We then independently coded these three transcripts and met after completing each to discuss where our coding either aligned or diverged. Modifications to the codebook were made when it was agreed that differences between our coding were significant enough to warrant modification. This process continued until we had coded all three transcripts.

### *3.3.2 Transferability & Dependability*

I took steps to promote the transferability of findings in light of my plan to include recommendations for incorporating alternative digital credentials into the application review process. If the findings cannot be applied to institutions outside of this study, one of the primary objectives of this dissertation will be incomplete. Promoting transferability of findings started with purposive sampling. To help promote the dependability of my findings I provide documentation into the research process. I discuss both of these steps below in more detail.

***Purposive sampling.*** In Phase I, to help promote transferability, I combined purposive sampling with snowball sampling techniques to promote the likelihood that informants represented a range of institution types and selectivity. This maximized the range of views and opinions represented in the findings. When deciding whether or not to recruit an admissions officer into the study, I considered the type of institution they represented, the selectivity of the institution, and the admissions criteria required by their institution. My intention was to develop a pool of informants that sufficiently represented a range of different approaches to admissions.

***Establish an audit trail.*** Research studies are viewed as dependable when it is possible for researchers to reproduce the study. With qualitative studies reliability is improved by including a detailed account of how data collection and analysis methods unfolded over the course of the study. My goal with establishing an audit trail was to document the processes I followed to arrive at my conclusions. Throughout the study I kept a research journal in which I documented the different steps of the study and recorded and developed analytic memos. I continued this research journal as I moved through second cycle data analysis. This resource can be made available as supporting documentation upon request.

## 3.4 A look ahead to the remaining chapters

In the following chapter I present my findings for each research question providing quotes as supporting evidence. This is followed by my discussion where I situate my findings within the context of the background literature that has informed this study. I conclude the dissertation by resituating this study within the current context of college admissions and discuss implications of using alternative digital credentials to promote college access.

# Chapter 4

# Findings

The purpose of this study is to develop recommendations for implementing alternative digital credentials as part of the holistic review of college applications to four-year universities and colleges in the United States based on an exploration of how information about informal learning is used in admissions decisions. To achieve this goal, I conducted a qualitative study of college admissions officers (application readers) exploring how they report using information about applicant's informal learning to make admissions decisions. To conduct the study, I purposefully sampled twelve (n=12) informants from three different types of higher education institutions: public comprehensive, private comprehensive, and private liberal arts institutions. Institutions within each group range from highly selective to access-driven. Two research questions guide the study:

1. How do college admissions personnel utilize information about students' informal learning to make admissions decisions?
2. How might alternative digital credentials improve the legibility of informal learning in application review processes?

The study proceeded in two phases. Phase II consisted of a subsample of six Phase I participants. Sub-questions for RQ1 focused on understanding the informant's approach to holistic review; how informal learning is used in holistic review; how admissions requirements to STEM programs may differ from general undergraduate admissions requirements; and the impact of the

COVID-19 pandemic and social justice protests on their admissions practices. Phase II examined RQ2 but built off of findings from RQ1. I designed RQ2 sub-questions to address three emergent themes from Phase I: personal qualities and their significance to college success, the challenges of warranting evidence of personal qualities, and the concept of extracurricular opportunity (how they understand it and think about it in their work). Phase II interviews included the use of two conversational prompts (Turkle, 2007) representative of two different alternative digital credential concepts; one representing a competency profile from the Mastery Transcript and the other representing a map displaying the availability of afterschool programming in the Chicago. I used these prompts to scaffold informants' understanding of alternative digital credentials (Turkle, 2007). I discuss these prompts in more detail below when introducing RQ2 findings.

In the following section, I present findings for Research Question 1: How do college admissions personnel utilize information about students' informal learning to make admissions decisions? I then present findings from Research Question 2: How might digital credentialing be employed to improve the legibility of informal learning in the application review process? Because RQ2 grew out of findings from Phase I, select findings from Phase I are included as supporting evidence for RQ2 sub-questions.

### 4.1 Research question 1: How do college admissions personnel report utilizing information about students' informal learning to make admissions decisions

Informants reported different approaches to utilizing information about informal learning to make admissions decisions with approaches differing by institutional control and selectivity. Private institutions, regardless of their selectivity, conducted holistic review of all applications they received as did selective public comprehensive institutions. Access-driven institutions

conducted holistic review of only those applications that failed to meet minimum academic requirements.

High application volume was associated with highly selective institutions. The following quote from informant Gordon Lister captures a typical ratio of application volume to staff at highly selective institutions: “You know, at Robinette, our overall application numbers last year, we were pushing over 40,000 applications spread between a reading team of about 50 individuals.” This ratio of eight-hundred applications to each application reader significantly constrains the amount of time informants reported having to read each application. When specifically asked how much time they take to read any application informants reported that 20-minutes was a typical amount of time. Some applications receive far less attention than others, however. For example, Norah O’Brian, an application reader from a highly selective private university reported the following: “The reality is like for most kids I don't need more than eight to twelve minutes to determine if it's a compelling student. I see so many who aren't, right.” Norah’s institution gives every application attention, but because they are highly selective, they may not give every application the same attention.

Outside their roles as application readers, informants also reported having additional admissions responsibilities. For example, all informants reported recruiting and counseling prospective students and their families whether on campus or off. Those that served in managerial roles (n=10) often reported conducting training for new college admissions personnel. In the quote below, Noelle Cassidy, who was not a manager, describes her own training:

> Carlisle University has an extensive training process, so when I was hired in [date removed] there was like a 12-week training process. And so, there was extensive application and interview training. We kind of go through each component of the

> application. There's also a lot of guides given to you as like rules of thumb. [Noelle Cassidy, Highly Selective]

Noelle Cassidy later added, “The training is very, quite comprehensive and you read a lot of applications for practice and then get feedback on your review. Something Carlisle University does a really good job of is training their readers.”

Application reader training at selective to highly selective institutions will include training admissions officers to look for specific types of signals in the application. This may include training on how to rate specific types of extracurricular activities:

> In our reader training we got a big book, and it had like sections for each part of the application and in the extracurricular section. There are these charts of activities that they learned about or didn't care about, and certain activities will get certain ratings, and they were very like ratings heavy. And that's how it worked there, and you'd be like okay they're in the international competition that gets this rating, in the state level competition that gets a different rating. Like it would have kind of those different connotations. [Norah O’Brian, Highly Selective]

Informants reported that having standard representations of extracurricular experiences makes training application readers easier and helps reduce bias in their decision making by establishing clear connections between specific types of signals and how those signals should be judged.

Informants typically associated the concept of informal learning with extracurricular engagement and personal qualities observed indirectly through a review of qualitative application materials. When describing what they consider to be extracurricular activities, informants included both formal school-based activities organized outside of classroom learning as well as informal out-of-school activities. Examples and specific references to extracurricular activities included, but were not limited to, information about hobbies, athletics and competitive clubs (both school-affiliated and not), community service, unique talents and achievements,

home responsibilities, employment, and afterschool community-based programs. Information about engagement in extracurricular activities, whether a formal or informal activity, was used to infer personal qualities like leadership, intellectual curiosity, and perseverance, or to look for specific types of activities. In the following sub-sections, I discuss these themes in more detail and discuss ways in which selectivity associated with specific approaches to evaluating informal learning.

### *4.1.1 Reading between the lines: Inferring nonacademic factors of college readiness through indirect signals*

Informants in this study reported using the Common Application, letters of recommendation, and personal essays along with contextual information to evaluate personal qualities communicated through information about informal learning experiences. A quote from Gordon Lister below captures how informants felt certain application materials were better suited for understanding certain aspects of an applicant than others:

> The Common App is designed to capture more of those emotive, motivational, those personal elements, those personality elements I should say, and not necessarily the sort of cognitive elements. And I think that between the three, right between transcripts, recommendation letters, and Common App we are as admissions people able to make inferences about cognitive ability, based on all of that context put together right if they're you know if they're showing that. [Gordon Lister, Highly Selective]

Gordon is drawing a distinction between the different types of application materials he uses and the types of signals they are designed to send. Evaluating personal qualities is a process of inferring personal qualities by combining information communicated across these materials. through extracurricular activities, letters of recommendation, and student essays.

While no informant reported using a formal assessment to evaluate personal qualities, informants often mentioned that their offices tailor essay questions to draw out evidence and demonstrations of particular personal qualities:

> We actually use the William Sedlacek book, and we took a look at non-cognitive variables, and so we embedded that in the types of essay questions that we asked, as well as the academic evaluation [Kayla Smith, Selective].

This approach associated with highly selective and selective institutions that required all applicants to submit personal essays. Informants from access-driven institutions reported that their institutions conducted holistic review of only those applications that failed to meet minimum academic requirements. These applications, those that failed to meet minimum academic requirements, are forwarded to a committee that may or may not include the initial application reader:

> So, most of the time . . . I would send [applications that do not meet academic requirements] to a committee review, and those are folks who are looking more deeply into which classes the applicant is getting the lowest grades in, what those trends were. But I can also put in my recommendations when I send that file to committee. [Ada Wallace, Access-driven]

When asked what she might include in a recommendation to committee members, Ada explained how she relies on notes from her first-hand experiences with applicants:

> So, if I'm having a conversation with [an applicant] which I typically do, even though not necessary, I'll say, "Hey, what's been going on in ninth grade, or what was the scenario like, what's this trend look like for you, or how senior you might I don't have. But tell me how you think it's going, especially if they are grades are below requirements." So even just giving more humanity to the number I see is helpful when I send that to committee and say, "Hey, here's the context: The student change schools, or actually the dealing

> with Covid." So, I'll put those in the review, so that they can have some information. [Ada Wallace, Access-driven]

Other access-driven institutions reported they request personal statements from applications that fail to meet minimum academic requirements. An example of this comes from informant Bill Alton who works at an access-driven public institution. He explained that applicants who do not meet minimum academic requirements are asked to submit an essay explaining how they "bounced back" from those academic challenges:

> A lot of it is for me and for my colleagues, it's how does a student bounce back, you know? Certainly, we look at that first from an academic standpoint, but then we also say how do you bounce back in your life. Are you making strides to do better for yourself? And not in every case are we going to admit somebody like this, you know. There may be times when we're going to say you know the academic performance is simply too low. [Bill Alton, Access-driven]

Again, the focus is on inferring personal qualities like perseverance from qualitative information sources. But compare Ada and Bill's approaches to holistic review to an approach described by an informant from a highly selective public university:

> [Application review] requires the admissions officer to have so much training and to read between the lines, and like look at, look for this, and so many ways. It's like, things that are on this transcript I'm looking for and letters of recommendation and the descriptions of the activities and essays and which is good to be looking at all that but it's like, I'm piecing together a lot of little information because the transcripts do tend to be so minimal, I guess. [Noelle Cassidy, Highly Selective]

Reading between the lines at both selective and access-driven institutions require compiling evidence from across the application to make judgements about an applicant's commitment in

learning opportunities both inside and outside of school. What sets them apart are their institution's mission. For example, Marvin Emory explained:

> That's when we have to start to say how are we going to craft this class, how are we going to make sure that we have you know enough players for our football team. You know, or how we're going to make sure we have enough people who are interested in what, we don't really admit to major, so it doesn't matter. If we only have three people who say they want to do biology we're going to admit those students, because they might change their mind but we're looking to see what else they're going to [do] what else they want to do on campus, what else they're interested in. [Marvin Emory, Highly Selective]

While access-driven institutions were looking for personal qualities to gain additional assurance that if admitted, the applicant would succeed, selective and highly selective institutions inferred personal qualities to draw distinctions between every application. This approach, which was typical of liberal arts colleges represented in this study, seemed not to be limited by high application volumes. Norah O'Brian, from a highly selective private university with a high volume of applications reported that her institution makes similar types of considerations:

> But yeah, we are really looking for students to, in their file, portray intellectual curiosity and kind of community-oriented . . . a community way that fits Benson University which is very collaborative, where students have to live for at least two years but typically four in a residential college suite setting. So, we're really looking for that kind of personal fit in our classrooms in our residential halls and kind of in the community. [Norah O'Brian, Highly Selective]

The student that Norah's institution wants will display personal qualities that speak to their interpersonal skills because these are seen as particularly valuable for success and social cohesion among the student body.

For some informants, reviewing student essays meant looking beyond the content of the essay to also evaluate the choices an applicant made when completing their essay:

> I think the choice of [essay] topic can also tell you something as here's a student who didn't think this through well. And sometimes you can see that in the execution. I think you can see good critical thinking in how a student takes a topic and what they do with it. You can take the most mundane topic and really write a great essay and that's going to show that you're prepared for this or thinking differently about topics. [Marvin Emory, Highly Selective]

The subtle choices an applicant makes when completing their application send indirect signals. Through essays, applicants not only communicate their ability to write well or respond appropriately to a writing prompt, but they also demonstrate important skills that may not be clearly represented in other parts of the application such as critical thinking.

Informants frequently stated they look for evidence of "meaning making" in student essays. Olive Wesley, from a selective liberal arts college indicated that with essays, it's not the topic that is important, what application readers are looking for in an essay is evidence of reflection and growth. Any essay that is going to have an impact on an evaluation of an applicant's potential is going to have reflection that tells the reader why the topic is important. It's this reflection that is judged more than anything else:

> I think that you will hear this a lot from people is that students don't understand that they, it doesn't, like the topic doesn't actually matter. It's about the reflection on the topic that they have done so I think everybody thinks that the trick to a good essay is having like the most interesting story and it's really not. I mean, I think that the probably the best. [Olive Wesley, Selective]

An applicant that connects what is listed on their transcript, discussed in their essays, and demonstrated through extracurricular activities and relationships with recommenders is also a

very appealing applicant because they convey deliberate alignment of interests and activities throughout their application. This suggests to admissions officers that the applicant has engaged in activities out of sincere interest in the activity itself as opposed to engaging in activities because it will look good on an application.:

> We want students who look like they stuck with something, and it plays out sort of everywhere in the three areas right. It plays out in the transcript it plays out in the courses they've taken. It plays out or you can see it directly to what they've written on the essays and then you can see a direct link in their extracurricular activities and it's a real bonus, if you have a recommendation that also speaks to it. [John Green, Selective]

Interestingly, drawing connections between different parts of the application may backfire in some situations. This is represented by the "overly curated" applications described by John earlier in our conversation:

> So outside of the basic requirements I think what we've seen is as we're becoming more selective, applications that look very curated typically will rule someone out. So, there are a lot of applications that are a little too tight right like they are really curious. You can probably tell there's been a lot of assistance, a lot of paid assistance and curating not just the essays but in the extracurricular activities, the order in which they were taken. It just looks incredibly curated and those we are less interested in. I won't say it's a clear no but over time it's becoming more and more of a "no" [admit]. [John Green, Selective]

John went on to explain that "[Our application readers] are looking for independent thinkers and doers and when it looks like there's been a great deal of assistance, we don't know how committed the student is to us." John believes an overly curated application signals that the applicant is not presenting themselves honestly or in their own words. To John, this suggests an inability to think for oneself and a lack of a genuine interest in attending his institution.

Materials designed to communicate academic factors may also send indirect signals of personal qualities. For example, some informants reported being trained to make inferences about personal qualities from grade trends—whether a student's grades have gone up or down over the four years of high school. One participant from a selective public university, Kayla Smith, noted that if grades trend down or are inconsistent, it signals that she should look for explanations for this trend in other parts of the application, much like Ada Wallace will inquire into a prospective student's life when she meets face-to-face with them. Two places Kayla Smith reported finding corroborating information included a student's personal essays or in the academic evaluation forms:

> I tend to also look at grade trends, because, and then, particularly if I see a grade trend, where the grade trend is going down or if it's not consistent. I also try to look for other things in the application that can help fill in the blanks about why that could have occurred. So, typically I'm also then looking at the essays that the student has submitted to see if it explains any of that or, especially the academic evaluations. And I very much value academic evaluations by teachers and by you know admissions counselors but certainly the teachers who've actually taught the students. [Kayla Smith, Selective]

She described another grade trend later in our conversation:

> Sure, certainly grade trends, you know I talked about that and then particular grades in core courses like if I'm looking at a transcript and the only As that I see are in elective courses, or you know, like music or dance and there's you know you're looking at math and English and science and they're all Fs, then that definitely is you know brings up areas of concern, because we don't want to admit students to the institution, who aren't going to be successful. That's not in the best interest of the student or in the institution and then there's financial ramifications, you know related to that. [Kayla Smith, Selective]

Another participant in this study, Olive Wesley, described a different way of using academic transcripts to infer specific nonacademic factors:

> So, we have an eight to one student faculty ratio. It's one of the lowest in the country. But 63% of our classes are actually one-to-one, so there's a lot of tutorials, there's a lot of independent studies and research opportunities . . . So, it's got to be a student who is, I think, really interested in being a very active participant in their education. And you know we're looking for a student with a lot of intellectual curiosity. [Olive Wesley, Selective]

In our conversation, Olive described how reviewing the applicant's courses on their academic transcript helps her gain a better understanding of an applicant's intellectual curiosity, a quality she believes is important given the emphasis her institution places on independent study. Did the student take the most advanced courses? Was there a more advanced course to take? Why did the student not take the more advanced course? These questions often do not come from one information source. Sometimes corroboration is found in personal essays or letters of recommendation if they are good, which informants reported they generally are not. The following quote from John captures this idea:

> And you don't expect that every student will be super candid about the most difficult experience in their life, but you don't want to say, the one time I got an F on a quiz. It was the only F I ever got. And the application reader is just like okay well I'm probably not interested in that kid right like you don't have a capacity to understand failure and resilience and that's what we would say in our in our read of it right. If that's the biggest thing you've pointed out, then you might not have the capacity for not getting into the fraternity not fitting in on campus being away from home not getting the same level mental health services that you got with a private therapist, right. [John Green, Selective]

Essays are, however, particularly important in highly selective admissions processes:

> Yeah, so when we think about where student differentiates in the most highly selective processes typically extracurriculars are not going to be the place where that happens. It's going to come through in their essays and in their letters of recommendation and that's sort of where we spend the bulk of our committee time evaluating fit for the institution because again academic fit is important. We are, first and foremost, an academic institution. [Norah O'Brian, Highly Selective]

Another source of information about personal qualities included examples of student work like creative writing examples or research reports. When asked how he makes sense of student work as a signal of college readiness, Marvin expressed feeling like he lacked the knowledge to evaluate student work from an academic standpoint and indicated he uses student work examples to better understand an applicant's passion and interests more than their academic potential:

> I can't distinguish between [different] levels of goodness of the musicians necessarily. No, I look at that stuff as it's extra that helps me understand what the student really loves to do. But we aren't we aren't making admissions decisions based off of it or not, saying Steve your artwork is the best that we received this year. We're going to overlook the 15 Ds you've earned in high school and admit you to this institution. Because we can't. We're an academic institution so that's the tricky part students want to submit this stuff we look at it, but we're also clear and saying this is not going to be the make-or-break part of your application. [Marvin Emory, Highly Selective]

I revisit Marvin's discussion of student work examples below when reporting findings to RQ2. Next, I present findings that describe how informants reported interpreting extracurricular engagement patterns.

#### *4.1.2 Evaluating engagement patterns: Ideal types*

Informants placed an emphasis on the Common Application activities list as an organizing tool for evaluating informal learning experiences, what informants typically called

extracurricular activities and engagement. Informants frequently indicated that they understand the applicant's commitment to extracurricular engagement in terms of time and roles within the organization because these are the signals the activities list requires applicants to include in their description of their engagement with a particular experience or activity. The quote below from Noelle Cassidy describes a common approach to evaluating information included on the Common Application activities list:

> So, the first thing when I open up the involvement section of the application before I even read anything I'm immediately scanning the Common App [where] you can submit how many years you've been a part of something and how many hours a week, and how many weeks a year you commit to that thing. And so, if the student's involvement is filled with like one week or one-off events like I volunteered at this place one time, and I joined this club senior year and I joined this club junior year and, like all of their involvement is kind of spotty like you can see it's not consistent. That's the first thing I'm assessing. So, before I'm even reading what the involvement is I'm scanning the columns [to see] how committed a student has been to whatever these things are and then I'll look at each thing individually, but the big picture is have they been committed, do they have greater depth and quality. [Noelle Cassidy, Highly Selective]

Noelle's quote captures the idea that informants reported caring less about what applicants did outside of school and more about how they did it: whether or not the applicant demonstrates deep and sustained commitment to *meaningful* activities. For example, extracurricular involvement with no clear signal of accomplishment may not communicate information about college readiness:

> So, involvement . . . that isn't necessarily regulated is hard to see value in. So, for example, I have students who say, "Oh, I like to go camping and like to hang out with my family." Like, that's not really an activity. That's a fun thing we'd like to know about you,

> but that's not really like an accomplishment to put on your application. [Noelle Cassidy; Highly Selective]

To be valued by admissions officers, engagement should speak either to the student's attitude or their academic readiness. Noelle believes this often occurs in regulated activities. It is unclear exactly what Noelle meant by "regulated" activities; she seems to be referring to activities completed out of a desire to challenge oneself rather than those done for pure enjoyment.

Some informants reported ways in which specific types of information about informal learning experiences is used to contextualize and better understand engagement patterns. For example, Marvin reported making inferences about what engagement with competitive swimming required of the applicant and how this informs his broader evaluation of the application:

> When I do presentations and students ask me about this, I always say it is not the number of things that you do it's you know how involved are you in these things? I know that the students that are varsity swimmers might have practice five days a week, they have practice at six o'clock in the morning before they go to school, then they might have after school practice for two hours. When do they have the time to be involved in other things? And that's okay I don't, I am perfectly happy to see that. I imagine that's the kind of person who's going to want to be swimming competitively in college. [Marvin Emory, Highly Selective]

Marvin considers the level of commitment typically required for competitive swimming and uses this information to make inferences about the applicant's availability to engage in other activities. It also informs his sense of what the applicant is likely to pursue once arriving on campus.

While informants emphasized the importance of demonstrating "deep and sustained commitment" there was at least one instance where demonstrating a specific pattern of

engagement became significant. The quote below from Peter Jackon, an application reader from a highly selective public comprehensive institution, captures the significance of seeing evidence of career exposure and how this informs the admissions officers' perceptions of college readiness (Note: Peter uses the word "advised" but this should be interpreted as informal mentorship):

> I had a student I advised years ago. I'm going to digress just a little here but grew up in [name of city removed]. His dad was a mechanic, and the student ended up getting a PhD in aerospace engineering out of Carlisle University. And he told me when he was in some of his engineering classes, it was clear to him that pretty much every, all of his peers, never used a wrench in their life. Never did any of this. And he grew up working on cars, his dad was a NASCAR guy. In fact, he ended up doing internships with a NASCAR crew one year at a speedway. But as a kid, he and his brother were handing his dad tools and helping him take apart motors and putting them back together again right. So, it wasn't just book smarts. [Peter Jackson, Selective]

What stands out to Peter Jackson, in terms of this student, is the context from which the student came and the exposure he had to work and career opportunities. Peter noted the student came from a low-income background but had significant hands-on experience working on cars with his father who also happened to work professionally as an auto mechanic. Having insight into these experiences, in Peter's opinion, played a significant role in predicting the applicant's success both academically and professionally. Peter believes the experience of learning from his father provided the student with practical hands-on experience that set them apart from the typical book smarts of their peers.

Seeing evidence of early career exposure was also important to informants who reported reviewing applications to academic programs that admit students as freshmen, many of which include STEM disciplines such as engineering and nursing. According to informants, when admitted to these four-year programs, students often follow a highly prescribed curriculum that

may begin as early as the first semester of a student's freshman year and continue until graduation. Because the curriculum is highly prescribed, transferring out of the program can result in a significant loss of credits which itself contributes to increased time to degree completion and increased tuition costs. Informants reported that seeing exposure to the field of study at the time of application gave them additional confidence that if admitted, the student would persist with the major:

> So, if you start the nursing program and you realize it's not for you, you pretty much are adding on a year of college like it's not as easy to transfer out. I mean you can transfer out, but your nursing credits aren't going to do anything for you for your liberal arts degree or your engineering degree. And so, they really want students to show that they have thought about this. So, for nursing, physical therapy, engineering - not as much engineering mostly nursing and other health related programs - they're looking for specific involvement in that area. [Noelle Cassidy, Highly Selective]

I found the emphasis on nursing programs at an access-driven institution as well:

> [The applicant is] like, I really like the science part of nursing, or I like the bedside manner. So, if they like the bedside manner, it's more like, okay, well, have you ever considered psychology, right? If you're trying to help people uh with that, because nursing is way more than just bedside manner. Right? We've had nursing students where they don't like, where they don't like blood, and it's like, Wow! You might want it to reconsider nursing. They've never considered wiping a butt. [Aaron Rodric, Selective]

In these examples, a specific engagement pattern (career exposure) is valued as a signal that the applicant has gone out of their way to understand what a particular career pathway entails and has taken the steps to get meaningful exposure. What is and is not meaningful, however, is determined by the application reader rather than the applicant. These are beliefs about what types

of experiences adequately prepare an applicant for their education and navigation of a career pathway.

### *4.1.3 Extracurricular exceptionalism: The role of selectivity in the evaluation of informal learning experiences*

Demonstrating involvement in specific types of informal learning experiences associated with an institution's selectivity in other ways. For example, Norah O'Brian stated that her office cares more about achievement at the international level as opposed to regional or local level due to the highly competitive nature of their applicant pool:

> But again, there's like local we don't care about. State we don't care about. National, you're peaking our attention, like super high list of top three people in [a] category, international, okay, you got something going for you. So, we develop [a list of notable achievements] every year and, like that's a list of probably 20 items. [Norah O'Brian]

At highly selective institutions, demonstrating deep and sustained extracurricular engagement seemed insufficient to rise to the top of the application pool. Applicants must engage in specific types of extracurricular activities at a high level of achievement. Norah did later add that her institution also places significant weight on work experiences because it is so rare among applicants to her institution.

This focus on exceptionalism in extracurricular engagement also occurred at access-driven institutions with selective secondary admissions processes such as when admitted applicants are considered for admission to competitive professional pathway programs that include scholarships. For consideration for admission to a fully funded health profession pathway program at Kayla's institution, a demonstrated interest in a health career through some type of exploratory activity is required to be considered for admission. But because the program

is competitive, and because all applicants must meet minimum academic requirements to be considered, admission to the program depends in part on demonstrating interest through what Kayla calls “substantive” rather than “nominal” experiences:

> I am amazed by the students that we see applying for admission to this program and the types of experiences that they have as high school students. Like, you don't see some college students with that type of experience. So, if it's something like the student volunteered at the hospital reception desk, that's not the same as a student who shadowed an anesthesiologist and had a chance to participate in, you know, surgeries or reviewing X-rays or doing cancer research. So, I would say that it has not been challenging to differentiate between what is more of a substantive experience and one that's just kind of nominal, for lack of a better term. [Kayla Smith, Selective]

So, something that may help an applicant rise above the rest of the applicant pool is a meaningful activity that directly relates to the student’s career interests. With all of this said, Kayla qualified her answer by saying she considers the extracurricular opportunities available to a student when evaluating whether an experience is more substantive or more nominal. It was unclear exactly how she would come to know about an applicant’s extracurricular opportunities.

#### *4.1.4 Summary of Findings Related to RQ1*

In Phase I of this study, I asked how college admissions officers utilize information about students’ informal learning to make admissions decisions. My investigation of this questions has found the following:

- All institution types want to see commitment to learning outside of school but look for different signals.
- Personal qualities are inferred from a variety of sources including qualitative application materials, personal experiences with applicants, grade trends, and student work examples.

- Evidence of reflection, meaning making, and coherence are strong signals of college readiness communicated through an applicant's curation of their file.
- An application reader may evaluate extracurricular engagement based on its connection to career exploration or its substance.

## 4.2 Research question 2: How might alternative digital credentials improve the legibility of informal learning in application review processes?

The second research question asks how college admissions personnel perceive the potential of alternative credentialing systems as part of college admissions. Findings come primarily from the second interview with informants, however, findings from Phase I regarding the use of personal experiences to contextualize extracurricular engagement and findings describing how application readers use examples of student work in their admissions decision are presented as supporting evidence given their alignment with the affordances of alternative digital credentials.

During Phase II interviews, I showed informants two examples of innovative credentialing tools: the Mastery Transcript and the Opportunity Landscape dashboard. The Mastery Transcript (Appendix C) is an example of a comprehensive learning record. The Opportunity Landscape dashboard (Appendix D) is a mapping tool developed by researchers involved in the Chicago City of Learning project designed to capture and visualize the location of afterschool learning opportunities in the city of Chicago.

### *4.2.1 Definitions of personal qualities are not universally accepted and may be contested*

In the second interview, informants were asked to provide their opinion on the personal qualities they believe are particularly valuable to student success at their institution from a list of ten personal qualities mentioned by informants in Phase I interviews. Informants were also asked

to provide their opinion on how well existing application materials help them validate these qualities. My objective was to understand the opportunities and challenges of improving the legibility of personal qualities using a credential like the Mastery Transcript to visually represent the development of a profile of personal qualities backed by verifiable evidence. In the section that follows, I focus on three personal qualities—perseverance, leadership, and empathy—to demonstrate how some personal qualities are easier to validate than others.

Most informants, if not all, felt perseverance is vital to student success and reported that they look for evidence of it in a variety of places in the application such as in personal essays, letters of recommendation, extracurricular engagement patterns, and even academic signals such as grade trends. Despite the many sources for understanding perseverance, some informants felt perseverance is difficult to accurately judge with the materials currently at their disposal. One reason for this is that there are no agreed upon definitions of what perseverance is and how it is represented in an applicant's application. Gordon Lister felt this way in part because of the way in which qualities like commitment can be misinterpreted as perseverance in his opinion:

> Perseverance is something it needs to be clearly defined because there are folks who I see, sometimes, confuse perseverance with commitment. Right, like, I think there, there are folks that say like this student has persevered through varsity sport for 4 years. And so, therefore they demonstrate perseverance. And the question that rises for me is, is that perseverance or is that commitment? That's certainly commitment, but perseverance to me . . . it has to imply that there's a certain . . . challenge. There's a story about challenge that has to be clear in order to sort of break that threshold to be classified as perseverance. [Gordon Lister, Highly Selective]

To Gordon, perseverance and commitment may look the same on paper, but a deeper understanding of the challenges that came with commitment are what demonstrate perseverance.

Seeing evidence of challenges is necessary for Gordon to see engagement as more than just commitment:

Leadership was also commonly listed as an important skill for applicants to have and informants felt it is much easier to see through an application than a quality like perseverance because the Common Application activities list specifically asks applicants to include information on the roles and responsibilities the student held in extracurricular activities. However, most informants felt leadership can be demonstrated in a variety of ways and they would like to see applicants recognize more diverse forms of leadership rather than relying on formal roles in clubs and sports:

> I think most high school students aren't yet trained to think about leadership. Beyond formal leadership roles. And so even though we try to encourage that, like when I met with students, I would say like, just because you're not the president of NHS, like maybe you took the lead on this specific, you know, car wash and you were the one who helped set it up. Like, can you think about times that you demonstrated leadership, but I feel like most high schoolers only think about leadership in terms of like those formal club positions that of course is really easy on paper. [Noelle Cassidy, Highly Selective]

Noelle went on to explain that she often sees first-generation applicants and applicants from under-resourced high schools focusing on formal leadership roles in their applications while not including other valuable signals of leadership:

> So, especially with first-gen or, students coming from more under-resourced high schools that maybe don't have as much coaching or guidance over like how to put this on an application, like they'll usually not put a lot of stuff in the activity section. And then often the letters of recommendation will be like, oh this student like babysits all the kids in the neighborhood and they also play volleyball, and they also like work at Starbucks and you're like, why didn't they put any of this? [Noelle Cassidy, Highly Selective]

Leadership can be demonstrated in many ways. The typical way of capturing leadership in application materials privileges formal roles and responsibilities within clubs and organizations. Outside of formal roles and responsibilities, informants felt there were many ways for students to demonstrate leadership but informants felt students focus mostly on roles in formal clubs.

Empathy was a personal quality that informants saw as one of the more challenging skills to validate. Informants who talked about empathy discussed its importance to student success and the challenges they have in understanding it through paper applications:

> Empathy can be fuzzy. Because we're reading, you know, these are paper applications. And so, empathy, empathy is one that you know is, it has to be sort of interpreted somewhat indirectly or inferred. Where I look for empathy is usually in [interview reports], if I'm reading for an institution that has interviews as part of their admission process. [Gordon Lister, Highly Selective]

Not every quality can be captured through traditional application materials. Some have to be seen to be believed or understood.

There were also some qualities that informants felt would be unnecessary to credential because the existing application materials already do a good job of capturing them. Leadership, discussed above, was one example. Communication was another:

> So, for example, communication, you know, students take, you know, English 101, or composition or whatever. We're still looking to see how they communicate about themselves and maybe we wouldn't take a credential for that. We're looking at the essay itself is that sort of credential [John Green, Selective]

In my second interview with John Green, when I showed him the Mastery Transcript, he emphasized the value of having a standard tool for representing personal qualities.

> Certainly, I'm excited about the idea again and I said earlier, to have some type of a standardized form for the non-standardized experiences right. [John Green, Selective]

When asked to elaborate on why a standardized form for non-standardized experiences would be helpful, he added the following:

> And that, and I think that's to direct the applicant to what might be most helpful for the reader instead of just hoping that the applicant can somehow get it there right. And so that we can also train to it in a way, that is not so it's not as nuanced or contextual. [John Green, Selective]

John explained the advantages of having a tool like the Mastery Transcript. One is the significance of giving applicants' greater agency to indicate the personal qualities and experiences that they believe are admissions officers should know about them rather than those that are important to the admissions office. The second advantage is the ability to document and signal personal qualities in a way that does not depend on the applicant writing a well-written and convincing essay. This would provide greater consistency in how personal qualities are represented across all applications.

### *4.2.2 The use of student work examples in holistic review*

The ability to capture and communicate examples of student work as evidence of learning is one of the fundamental affordances of alternative digital credentials like digital badges. In Phase I, informants reported receiving examples of student work as part of applications and discussed how they use these materials to evaluate personal qualities. Some institutions, such as Norah O'Brian's, have very formal processes for submitting supplemental materials that may include work examples. Students are allowed to submit up to five supplements. There are supplements for research, art, dance, music, and creative writing. They are reviewed for

proficiency in the field by a team of admissions officers who specialize in these fields. This includes a STEM team that is specialized in reading STEM research reports:

> We have a STEM team because we don't know what's going on in some of those files, so we want some opinions there and we have people that just really know music and the arts well so maybe it's going to hit their caseload and maybe it's just someone who's reading from across the country. And it's pretty random at that point, but we're getting that national perspective versus this student looks really strong in Nevada. We want to know how they look in our pool at large, after that. [Norah O'Brian, Highly Selective]

Nora described these teams as "national" in the sense that they are considering the strength of an application against the national pool of applications. This aligns with Norah's comments above that her institution is primarily concerned with achievement at the national or international level.

Examples of non-standardized supplemental materials (student work examples) that might be submitted by applicants included, but were not limited to, research reports, creative writing, artwork, recorded monologues, and musical performances. Student work examples are often submitted directly to the application reader by email or as part of "the other box" on an application form. Non-standard supplemental materials will, at the very least, be looked at by application readers, but they may not be thoroughly reviewed or given the same attention as the standardized supplements in Nora's example above:

> Our sort of philosophy is that we are putting eyes on every document, but that doesn't mean that every document is getting the same amount of time spent on it. [Norah O'Brian, Highly Selective]

Time constraints brought on by large application volumes is one reason student work examples and other supplemental materials are not given much attention. A quote from Noelle Cassidy speaks to both this issue:

> So usually, we don't have time [to look at supplemental materials], and the challenge is if it doesn't fit into the constraints of what we've asked for it. So, like students would often email me especially if they were waitlisted, they would email me and be like, 'I want to send you this research paper I wrote,' and I would like rarely open those because we're not allowed to take that into account because it wasn't a part of the application. And again, it's not really fair because, like rural first gen low-income students of color like they don't know to send extra stuff like that, like they're not sending supplemental materials in ways that students from well resource backgrounds are. So, we usually don't consider supplemental materials, if anything, it's just like for fun like I'll open the website and be like oh look at this cute little food blog. [Noelle Cassidy, Highly Selective]

Another reason informants reported disregarding student work examples is because they felt they themselves lacked the academic or artistic knowledge to give the work a fair and proper evaluation. Olive Wesley explained how her familiarity with the topic of the supplemental material will influence whether she gives it much attention:

> I am certainly more likely to flip through poetry because that's something I know, and I have, I feel like I can judge a little more than a scientific treatise, right, but they both mean the same thing to me if you're submitting it. It's evidence that you're doing it. Do I take it, I mean I don't know if I take it as a stronger, I might take it as a little stronger evidence than if you're just putting it on your list of extracurriculars like I write poetry, or I do scientific research versus you know hey here's the title of my poster presentation that I did in the science fair last year. [Olive Wesely, Selective]

Marvin Emory also expressed feeling like he lacks the necessary knowledge to evaluate the quality of student work. He emphasized that his institution is not making admissions decisions based on this information, but rather they "look at student work as a way of knowing more about the student and what they want to bring to the community." Olive Wesley provided an anecdote that captures the same idea:

> I mean one guy submitted . . . he submitted this like I don't know like 40-page research paper about a topic that I could not understand the first sentence. Okay, thanks, [I said to him]. And then I was interviewing him, and he wanted to talk about it. [And I said] "Oh, I haven't gotten to this yet" and I had looked at it, I just didn't understand it a bit. [Olive Wesley, Selective]

Olive later suggested that she might consider using something like this research report as a type of recruitment tool or a tool for understanding nonacademic factors:

> What I take from it is . . . I might say, oh, I can tell that this paper or your interest is about this, and this is our professor who is working on this project, it might be great for you to make a connection with that professor, to see what kind of research is happening. In our department that's more of like a recruitment tool. It doesn't have to do with selection, but I would say that what that paper did communicate to me, I don't have to understand and read the paper. He's showing me this thing, and I can tell he's super passionate about his work, as he has put in this extra time and he's clearly writing you know I can tell that the writing is a pretty high level, so you know it doesn't take me more than five minutes of flipping through this paper to understand that this is a student that is going to come to [the institution] and immediately dive into research and be a real asset to our department. [Olive Wesley, Selective]

Not only do college admissions personnel lack the time to properly judge these materials, they also believe they lack the knowledge to make inferences about what they mean about what an applicant knows and can do.

Findings also suggest that existing admissions practices and the involvement of faculty in the application review process are likely to inform policies about how alternative digital credentials and the evidence they contain should be reported to admissions offices. The question I posed to informants was whether they believed students could self-report something like the

Mastery Transcript or if it should come from a third-party such as the applicant's high school or their afterschool program provider:

> When it comes to self-assessment like even for our English placement course or English placement, we allow students to do a self-assessment. So, they fill out a questionnaire based on you know what level of, for lack of a better term, mastery they have in certain things like college writing or whatever and based on that they then get an assessment, and they select which English course they're going to have. So, for me, and I think, because I am at an access-driven institution, I would have less concern, or I wouldn't be concerned if the if the mastery transcript or you know the assessment is student-driven I wouldn't have as much concern about that. If I were at a different institution that was more competitive in terms of admission, I don't know. And if it was more of a faculty driven decision, then I suspect that maybe there would be you know more concern or, that they would want perhaps someone else like an adult or a faculty member or a teacher or someone who had expertise in that area, to provide that level of assessment. [Kayla Smith, Selective]

Kayla mentioned that her office already requires students to self-report cumulative GPA and test scores which leads her to believe that applicants could also self-report alternative digital credentials as well. Interviews with informants from selective institutions support Kayla's assumption that if she were at a more selective institution, her opinion might be different. For example, Gordon indicated that it would be essential for alternative digital credentials to come from the provider of the extracurricular activity rather than the student. This would help support perceptions of credibility of the credential among faculty:

> When I think about this question, I think about like, okay, if we were to change our evaluation processes, if we were to change what we need, or what we would be asking of students, how would we sell it to faculty? How would we convince them that this change is worthwhile and ultimately going to result in, I mean ultimately, more high-quality students right? [Gordon Lister, Highly Selective]

Next, I discuss the different sources of contextual information and informants' reaction to a dashboard used to represent the availability of informal learning opportunities within communities, what I have called the opportunity landscape dashboard.

### *4.2.3 The value and different sources of contextual information*

Informants reported using school profiles, the College Board's Landscape dashboard, and personal experiences with an applicant to contextualize applicants' experiences and achievements listed in their application file. Personal experience itself is a broader category that includes insight gathered from admissions interviews and email exchanges with the applicant, recruitment trips to an applicant's school, and the application reader's personal and professional history with their recruitment territory. Along with other context tools such as the school profile and the College Board's Landscape dashboard, personal experiences provide college admissions personnel with tacit knowledge that helps them contextualize both academic and extracurricular opportunity and engagement patterns. Extracurricular opportunity was also commonly associated with the COVID-19 pandemic. The following quote from Gordon Lister demonstrates how the COVID-19 pandemic forced contextualizing extracurricular engagement:

> While at Cerreta College [a liberal arts college] we had already been test-optional; we didn't have to worry about that aspect you know. We certainly had to, we certainly were a bit more forgiving when it came to grades submitted as they were you know a lot of places went to pass-fail grades, and so we had to some grade elements weren't quite as useful as they were before. We also were a bit more forgiving in terms of what we defined as a generally well engaged student when it came to the extracurriculars. [Gordon Lister, Highly Selective]

The quote below from John Green captures the value of having personal experiences with applicants during the COVID-19 public health response for understand what was and was not available to students:

> I do think, though, COVID itself has had some other impacts, and that is because COVID hit the entire country but not evenly in terms of activities and behavior or whatever. This is where I was saying I'm very grateful that we have regional and high school level readers who can understand what's going on in an area. So, if you were a student in [county name removed] county, you are likely in a remote environment for a long time. Definitely have mask mandates. Most out of school activities were not available to you in the in-person form which, for the most part, would include sports, right. And that's a big deal. If you were one county away none of that applies. You were still in person, you still got to do everything. [John Green, Selective]

Evidence from Phase I interviews suggests extracurricular opportunity is contextualized as a general practice by some admissions officers, even beyond the impact of the COVID-19 pandemic. Noelle Cassidy provides a good example of how college admissions professionals use their own background experiences to understand extracurricular engagement. Below, Noelle explains how the scarcity of opportunities and physical landscape in a community informs her evaluation of an applicant's personal qualities:

> But even just knowing the time commitment is so different like for a rural kid who's playing varsity basketball to go to an away game they might be driving two hours to get to that other high school. So, like I think it's just knowing the time commitment is so different for everything and. If the student has somehow magically found a way to be a part of things like robotics or like things that you know aren't common. That student has really gone above and beyond to find a way to make it happen like whether they made the club and they asked the teacher to sponsor it or they joined some online community like they really have to work hard. [Noelle Cassidy, Highly Selective]

Noelle specializes in rural applicants because she herself grew up in a rural community. She also recruited students from rural communities, including the community where she grew up, so she understands the effort required to engage in extracurricular opportunities. Another example comes from Norah O'Brian, an application reader from a selective private university that specializes in rural and international applicants.

> I come at this with the lens of someone who spends 90% of my time working with diversity recruitment and again for low-income rural students or minority students. I know from my experience, especially with rural students, there are schools around the country where they might have four extracurricular activities. When I covered Turkey for many years, internationally women in Turkey aren't allowed to basically do anything so they had two activities. But counselors have written to me to say like this is so impressive I don't know how they did it and they had two things that they were involved in right. [Norah O'Brian, Highly Selective]

This perspective was also expressed by one informant from an access-driven public university, albeit in reference to a competitive program for students interested in health professions:

> And then, sometimes there are students from rural areas, but they have gone above and beyond, to just get one experience and you know that it took them that much more work because they didn't have the resources and they're first-generation students. So, that also factors and that's why I was saying, so that student might be, you know competitive for position in this program because it also talks about their resiliency and their ability to find an opportunity, on their own as opposed to someone who may have been given a list of here's all, here's 20 opportunities, you need to apply for them and we're going to help you apply and I'm going to write you a letter of recommendation that kind of thing yeah. [Kayla Smith, Selective]

The knowledge that these informants have about the availability of extracurricular opportunities helps them understand what is typical of students in a particular community and what is not. This

in turn informs their understanding of the applicant's personal qualities such as the applicant's motivation to pursue interests outside of school.

In our second interview, Noelle indicated that there is likely room in the review process for something like the Mastery Transcript, but it would require additional context to interpret the information and a standardized approach to evaluating the document:

> And so, I'm thinking like if my institution where to start evaluating like mastery-based transcripts like we would have a significant training process for that and, like the leaders would determine how we would look at it. But for us it's really, really important that every application is looked at in the context of that high school. So, the very first thing you do when you look at an application or student's file is think, okay, where did the student go to school, what do I know about this high school. So, we actually have baked into the application, data on that high school. So, what is the average SAT at the high school? Do they offer AP? What is the average income of the Community or of the neighborhood? So, there's all these kinds of statistics available to us and we assess, you know, is this a well-resourced high school or what type of high school is this? Because our promise to them is always that we will never penalize them for not taking a class that wasn't available to them, or for not joining a club they couldn't join. Right, like, robotics is not a thing in (the rural part of the state). You can't join the robotics club. You know you can't take AP calc if it's not taught, so you have to know what opportunities were available to that student in their high school and then you can assess did the student make like take advantage of the opportunities that were available to them. [Noelle Cassidy, Highly Selective]

Some informants drew comparisons between the Opportunity Landscape dashboard and the College Board's Landscape dashboard. When comparing the two dashboards, Michael Lucas felt they complemented each other and provided a more complete view of an applicant's academic and extracurricular opportunities:

> [The College Board's Landscape dashboard] is just, it is so helpful. You will see, you know, apples to oranges, you know, comparison of kids and the socioeconomic level that they're coming from and both their home address and also the high school community. That is certainly helpful but doesn't address again sort of what happens outside the four walls of a classroom when it comes to extracurriculars. [Michael Lucas, Highly Selective]

John Green expressed a similar opinion:

> So, this is sort of this is a great extension of other products that we use, that would help us contextualize the applicant's environment . . . the College Board's Landscape dashboard. This is an even more helpful one that would help round out some of the information that Landscape might [already] provide. You know, Landscape is pretty blunt as a tool, not as sharp as perhaps one might assume. Because it's just zip codes. [John Green, Selective]

John later explained that they would most likely implement something like the dashboard during committee review when fine distinctions are being made between applicants:

> What we would do, at least on our side, is we would probably just map our schools or home addresses to [the opportunity landscape dashboard] and then sort of score it. That way we wouldn't have to look at each detail. We would probably just say, you know, low, medium, high opportunity [neighborhood]. This would help on the back end to get, you know, more down to the nitty gritty, but we would say, you know, this is a high opportunity area versus a low opportunity area. [John Green, Selective]

Admissions officers reported that they draw primarily on their own personal understanding of the availability of extracurricular experiences when thinking about extracurricular engagement patterns. They use this understanding to situate the applicant's engagement pattern within the context of the opportunities available to them. Understanding the availability of opportunities also communicates information about certain personal qualities.

### *4.2.4 Summary of Findings Related to RQ2*

In Phase II, I asked how might alternative digital credentials improve the legibility of informal learning in application review processes. This line of questioning, which included insight from Phase I interviews, produced the following findings:

- Informants believe that some personal qualities (e.g., leadership) are easier to document through an application than others (e.g., empathy).
- Application readers employ both narrow and broad definitions of certain personal qualities (e.g., leadership).
- Student work examples are unlikely to be evaluated for proficiency but do signal interest and personal qualities.
- Application readers use first-hand knowledge of the applicant's community to contextualize extracurricular opportunity and would welcome additional contextualization tools.

## 4.3 Summary

This chapter reported findings from the two research questions that guide this dissertation. Findings from RQ1 show that college application readers use personal qualities in their admissions decisions regardless of their institution's selectivity. Selective to highly selective institutions will also evaluate the depth and duration of an applicant's extracurricular engagement. There are a number of ways in which informants reported using specific types of information to make broader inferences about an applicant such as the commitment required of certain activities, the applicant's ability to make meaning from their experiences and draw connections between different parts of their application. The institution's selectivity also played a role in how extracurricular experiences are evaluated by application readers. Selectivity also

informed the types of extracurricular activities application readers looked for when reviewing applications as informants from highly selective institutions reported that they sometimes consider the prestige of an activity when making an admissions decision.

RQ2 examined how alternative digital credentials might be employed to improve the legibility of personal qualities and extracurricular opportunity in applications. The findings from this study suggest that application readers welcome additional information about personal qualities, but that the definitions of these concepts are not universal and, in some instances, may be contested. These findings also show that application readers already receive examples of student work but rarely, if ever, consider them because there is no formal process for receiving and evaluating this information. Furthermore, rather than demonstrating domain knowledge and expertise, application readers see examples of student work more as evidence of personal qualities. Finally, informants reported relying on contextual information, primarily from their own personal experiences, to evaluate an applicant's extracurricular opportunity. Informants saw the Opportunity Landscape dashboard as a potential tool that could formalize this process and support the holistic evaluation of extracurricular achievement.

# Chapter 5

## Discussion & Implications

Expanding access to higher education opportunities has been a persistent problem for college and universities since philanthropists, business leaders, and educational reformers worked to establish a standardized information infrastructure for evaluating college readiness more than 125 years ago. The standards that make up the infrastructure, such as grade-point average and standardized test scores, act as *boundary objects,* standards that are flexible enough to meet the unique information needs of both students and admissions officers while maintaining their meaning at scale. While these *boundary objects* representing college readiness addressed the perceived inefficiencies of determining who merited access to higher education at the time, the focus on efficiency privileged academic signals of college readiness such as grades and test scores which have consistently been found to correlate with socioeconomic status (Lemann, 1999; Dixon-Ramon, Everson, & McArdle, 2013; Zwick, 2017; Sternberg, 2020). This focus on academic signals has prevailed even as admissions offices have expanded what they believe college readiness to be. The continued reliance on academic signals has resulted in an information system that continues to present itself as a barrier to accessing higher education for those students who, arguably, are most likely to benefit from access—low-SES, first-generation, and racially-minoritized students.

Many institutions have turned to holistic review as a potential solution to the underrepresentation of marginalized students at their institutions. Holistic review emphasizes an

expanded definition of college readiness that includes the consideration of nonacademic factors believed to contribute to success in college, such as the applicant's personal qualities, their personal interests, and their learning experiences outside of school. These factors are often communicated through qualitative application materials such as personal essays, letters of recommendation, and lists of extracurricular engagement. However, research on the practice of holistic review and qualitative application materials has found that rather than serving as an equalizer in the admissions process, holistic review likely perpetuates the inequality it is meant to address (Stevens, 2006; (Lareau, 2006; Bennet, Lutz, & Jayaram, 2012; Zwick, 2017; Sternberg, 2020; Rosinger, Ford, & Choi, 2021; Jayakumar & Page, 2021).

Prior work that has examined the effects of provisioning consistent and standardized contextual information through a novel admissions dashboard on admissions outcomes has shown a correlation between provisioning this information and an increased representation of marginalized students in admitted classes (Bastedo & Bowman, 2017; Bastedo, et al., 2022; Bastedo, Umbricht, Bausch, Byun, & Bai, 2023). Taken together, this prior work raises questions about how information about nonacademic signals, specifically those associated with informal learning, are communicated through the existing information system of college admissions and how we might improve the legibility of this hard to quantify information through novel information systems. Not only are new *boundary objects* for communicating college readiness needed to enable meaningful change to the college admissions process, so too are new information systems for collecting and reporting evidence to support these claims to college readiness.

In this study, and building off prior work (Fishman, Teasley, & Cederquist, 2018; Pitt, Bell, Strickman, & Davis, 2019; Martin, Gutierrez, & Muldoon, 2020), I proposed alternative

digital credentials as a potential information system for improving the communication of informal learning outcomes and experiences to college admissions personnel, specifically for the people making admissions decisions. Guided by two research questions, the objective of the study described in this dissertation has been to examine how information about informal learning is currently used in admissions decisions:

1. How do college admissions personnel utilize information about informal learning experiences as part of their holistic review of college applications?
2. How might alternative digital credentials improve the legibility of informal learning in application review processes?

In the previous chapter I presented findings for each of these questions. In this chapter, I discuss these findings and present strategies for utilizing alternative digital credentials in the admissions process.

### 5.1 Research question 1

Findings from prior research that examined holistic review as a human-computer interaction problem described holistic review as a complex process of comparing and contrasting direct and indirect signals expressed throughout the application (Stevens, 2009; Sukumar, Metoyer, & He, 2018), and results from the study discussed in this dissertation support this characterization of holistic review. When evaluating students' informal learning experiences, college admissions officers in this study reported relying heavily on qualitative application materials such as personal essays and the Common Application's activities list to make both indirect and direct inferences about the outcomes of applicants' informal learning experiences, specifically evaluations of applicants' personal qualities and extracurricular engagement (Stevens, 2007; Hossler et al., 2019). Other sources of information about personal qualities and

interests included less obvious sources of information such as grade trends communicated through the academic transcript, examples of student work, and personal experiences college application personnel reported having with an applicant. Of these sources of information, Admissions officers in this study reported that essays are a particularly important source for gaining insight an applicant's informal learning experiences. Personal essays, and the essay prompts that shape what applicants communicate about themselves, are meant to be *boundary objects* that coordinate the exchange of information about how informal learning experiences speak to college readiness. However, the effectiveness of the personal essay as a *boundary object* is mediated by the applicant's own ability to reflect upon and make meaning out of their experiences and write a strong essay. Admissions officers felt that writing a strong essay is itself dependent upon access to writing resources that many marginalized students lack such as private admissions counseling, a dedicated college guidance counselor at their high school, and a social network that includes college educated individuals.

There are two ways comprehensive learning records might help address the problem of essay quality. One approach is to simply replace essays with comprehensive learning records like the Mastery Transcript. The use of a standardized tool would suggest successfully communicating information about one's personal qualities and extracurricular experience would no longer be dependent upon access to writing support. Findings from this study suggest that this is not simply a matter of replacing one tool for the other, however. While researchers are beginning to think more about the potential of alternative digital credentials like the Mastery Transcript for brining change to the admissions process (Liu, et al., 2023), less is known about how the information and evidence they communicate will be used in practice. What is needed is a better understanding of how admissions officers might "read between the lines" of digital

credential metadata. Comprehensive learner records like the Mastery Transcript are designed to be interactive and to send visual signals of the credential holder's competencies. Credit profiles like the radial graph of the Mastery Transcript may allow application readers to drill down to the metadata contained within individual digital badges, but are there certain metadata categories that send stronger signals than others? Additionally, what inferences are admissions officers able to make from different categories of digital credential metadata: how do they look beyond what is embedded in the credential?

To address this question, future studies should employ real comprehensive learner records in simulated admissions decisions. For the sake of convenience, this dissertation study employed a static representation of the Mastery Transcript. While this allowed me to convey the functions and capabilities of the Mastery Transcript, it did not allow informants to evaluate or interpret actual data on informal learning. To more fully understand how admissions officers might read between the lines of a comprehensive learning record, future studies should ask admissions officers to evaluate the contents of a fully functioning comprehensive learner record.

The other approach to addressing inequalities associated with essay quality might see comprehensive learning records like the Mastery Transcript used as a writing support tool for students. For example, how might the Mastery Transcript help youth reflect on the outcomes of their informal learning experiences, and how might the process of reflection support essay writing? One avenue researchers and designers of alternative digital credentialing systems might explore are ways of incorporating journaling tools into their platforms. Conceptually, such a system could draw on the data contained withing a student's digital badges to help them answer questions about their career exploration or other topics related to college personal essays. Prior research has already demonstrated how machine learning can be used to accurately judge and

assess personal qualities expressed in short essays submitted by students as part of the Common Application (Lira, et al., 2023). Rather than using such a tool to automate the review of a high volume of essays, it may be better to use a tool to help youth more accurately express their personal qualities through their writing. Research should explore how having a more permanent record of their experiences, one that makes their learning trajectory visible, might help youth write essays that speak the language of college admissions (Martin, Gutierrez, & Muldoon, 2020). A permenant record and other technological soltions may be insufficient writing supports by themselves. Ultimately, writing improves with practice and feedback. Youth need opportunities to reflect and write about their inforlam learning experiences built into their programming. Providers of informal learning experiences would benefit from additional training and programming designed specially to support their capacity to help students improve as writers.

Findings from this study suggest that we should also think more broadly about who might use alternative digital credentials. Prior research on alternative digital credentials in college admissions has primarily conceptualized alternative digital credentials as a tool for the applicant to signal information about themselves. This was the expectation for the study described in this dissertation. However, some admissions officers interviewed for this study felt a credential like the Mastery Transcript might improve how admissions offices communicate the profile of personal qualities they look for in applicants to prospective students, much like in the way admissions offices publish average GPA and test scores of admitted students. This is an interesting concept and one that should be examined in more detail. Future research might explore how the alternative digital credentialing systems can support the creation of multiple "informal learner personas" that capture the range of informal learning experiences and personal

qualities looked for in strong applicants. This line of research might also include studies of how alternative digital credentials support college planning activities such as helping youth understand what it means to be college ready when college readiness means more than academic achievement. Involving higher education institutions in this line of research would be ideal as they will be able to provide insight into how an informal learner persona of ideal applicants might look.

The idea of informal learner personas also raises the question of how having a tool for more directly signaling the personal qualities of an ideal candidate might shape how prospective students prepare for college. Would informal learner personas of ideal candidates help students think more expansively about how they are college ready, or might they discourage students who feel they do not fit the profile? How might the design of alternative digital credentialing systems account for this tension? These are questions that should be addressed as they will directly impact who does and does not see themselves as college ready and a good fit for a particular school.

Another question explored by this study is the role institutional selectivity plays in how personal extracurricular experiences are judged in holistic admissions decisions (Park, et al., 2023; Rosinger, Ford, & Choi, 2021) and how this may shape the way in which alternative digital credentials can be used in the admissions process. In the study discussed in this dissertation, admissions officers at highly selective institutions, and some selective programs at accessible institutions, reported that they draw distinctions between applicants based on the prestige or perceived quality of their informal learning experiences. These findings suggest the limitations of alternative digital credentials for addressing inequalities in college admissions at the most selective institutions where *what you do* often matters just as much as *how you did it*

(Jayakumar & Page, 2021). No number of digital badges is likely to overcome a preference for exceptionalism in extracurricular experiences no matter how useful alternative digital credentials may be for improving the legibility of informal learning experiences and outcomes. Again, this represents the failure of extracurricular experiences, as a category of admissions criteria, to serve as a *boundary object* of college readiness. Addressing this issue requires that admissions offices think more expansively about what exceptionalism in extracurricular experiences means. This is not an easy task as their ability to think more expansively about extracurricular experiences is constrained by their adherence to a framework that equates exceptional to elite. Findings from this study suggest that moving away from this framing of exceptionalism is constrained by the necessity of recruiting and admitting student athletes and a lack of tools for seeing exceptionalism in everyday experiences.

There are specific signals about extracurricular experiences that alternative digital credentials should be designed to signal so that all students can provide clearer indications of their college readiness. The first is career exploration. Signaling career exploration is unique because it has signifance at both selective and accessible institutions. At both types of instituitions, college admissions personnel reported looking for evidence of career exploration. The common example presented in the findings from this dissertation study was nursing. Informants reported having reservations about admitting applicants to nursing programs without some evidence of career exploration because they know from their own experience that many students often leave the degree program after learning more about what the work intails. Unfortunately, many students, particularly low-SES students, lack opportunities to gain exposure to valuable career exploration opportunities. Again, this suggests a limitation of alternative digital credentials for building pathways into higher education. Career exploration personas

developed using a digital credential like the Mastery Transcript may help youth better understand the types of experiences associated with specific careers. However, alternative digital credentials cannot address the underlying issue that low-income and first-generation youth have less access to career exploration opportunities. Ultimately, this may limit the usefulness of alternative digital credentials when it is the substance of the activity matters more than how well it is communicated by an applicant.

The second type of signal that could be amplified is the substantive nature of everyday experiences. One of the open questions regarding holistic review is how the nature of an applicant's engagement shapes the interpretation of the activities that are of significance for assessing college readiness. For example, two students may both play basketball as a hobby but do so in entirely different ways. One student might organize games at their local park while the other plays on an organized travel team. Do both experiences carry the same weight in the eyes of application readers (Rosinger, Ford, & Choi, 2021)? Findings from this study suggest that an application reader's perception of the weight of an experiences depends on how effectively the applicant is able to convey the signficance of the experience in the conext of their own life, what informants often called "meaning making." Some informants in this study felt making meaning out of one's experiences does not come naturally to all students, with first-generation and low-SES students cited as being more likely to struggle with this than students who are able to afford some type of private counceling. This implies that youth from low-SES backgrounds are at a significant disadvantage to their more well-off peers. This is one area where alternative digital credentials could have a profound impact on improving the admissions process. As discussed above, alternative digital credentials like the Mastery Transcript should be designed to help youth see connections between their different informal learning experiences. This may help

youth synthesize experiences into a convincing narrative that cleary communicates the relationship between their different interests and informal learning experiences. Supporting synthesis into a narrative is important because a hodgepodge of different experiences without a clear narrative linking them is unlikely to be very compelling to an application reader because it does not necessarily showcase authentic engagement that is deep and sustained over time. What this suggests is a need for alternative digital credentialing systems that go beyond being platforms for connecting youth to informal learning experiences and storing their digital badges to also be learning environments themselves where youth can develop a better understanding of how their out-of-school experiences speak to college readiness.

### 5.2 Research question 2

The second research question explored Phase I themes with informants that related closely to the affordances of alternative digital credentials. These three themes included: personal qualities and their significance to student success, challenges in evaluating evidence of informal learning, and extracurricular opportunity. I began Phase II interviews by asking informants to discuss the personal qualities of applicants they believe are important to student success, the typical signals for these qualities, as well as the qualities they find particularly challenging to document in an application. The objective of this line of questioning was to understand how personal qualities are validated, whether or not validation is necessary making an admissions decision, and ways in which alternative digital credentials might support validation.

Informants felt the design of certain application materials and the way in which information is presented to them contributes to the visibility of particular applicant attributes. Leadership, for example, is fairly easy to read from an application given the attention formal

roles and responsibilities in student clubs and sports are given on the Common Application's activities list (Park, et al., 2023). As a *boundary object* itself, the Common Application represents signals of college readiness communicated through extracurricular experiences as fairly robust signals because it is designed to collect very specific information about extracurricular activities like time commitment and formal roles and responsibilities. This is not how admissions officers in this dissertation reported understanding personal qualities, however. For example, personal qualities like perseverance and empathy, and even leadership, depend heavily on the application reader's own perception of what these concepts mean and how students might signal them. As *boundary objects* they take on fairly flexible meanings across admissions offices and even individual admissions officers. This is one problem that youth may face when using alternative digital credentials to signal personal qualities: even though they have a credential for perseverance, its effectiveness as a *boundary object* is limited by the admissions officer's own understanding of what really signals perseverance (Pitt, Bell, Strickman, & Davis, 2019).

Establishing agreed upon frameworks that define personal qualities that can be endorsed and adopted by other institutions is one approach to negotiating the meaning of specific personal qualities (Bowker & Star, 2000; Pitt, Bell, Strickman, & Davis, 2019; Martin, Gutierrez, & Muldoon, 2020). This is the approach that was taken at the turn of the 20th century when no universal definition of college readiness existed. We should not forget what the history of college admissions has taught us about how endorsement of a framework for college readiness by elite institutions shapes the admissions infrastructure. History has shown that institutional prestige influences which concepts of college readiness become commonplace and which do not (Lemann, 1999; VanOverbeke, 2008). Overtime, the frameworks endorsed by prestigious

institutions are likely to overshadow others and, again, shape our perceptions of what is and is not leadership. The definition of leadership takes such a robust form that it is no longer flexible enough to capture the many ways in which leadership can be expressed.

This is not how college admissions officers understand personal qualities, however. Responses from informants revealed admissions officers thought about leadership in a flexible and expansive manner. Admissions officers in this study expressed a desire for applicants to think more broadly about what might constitute leadership. It is not only formal roles such as being the president of the senior class, but it can also be seen in less formal experiences like caring for younger siblings. Ideally, frameworks for representing personal qualities need to be flexible enough to capture these broader interpretations of leadership. This would both reflect admissions officers' perception of personal qualities as flexible concepts and would likely encourage youth to submit a wide range of evidence to support their claims to personal qualities. Admissions offices should consider adopting open skills frameworks as a way of communicating with applicants about these questions. Publicizing the frameworks they use to evaluate personal qualities would help applicants answer these questions and perhaps might help them think outside the leadership box.

Findings from this study suggest that evidence contained withing alternative digital credentials is unlikely to be evaluated directly unless admissions process change in significant ways. Informants reported that many applicants already submit examples of their work but rarely, if ever, do application readers review this information. Informants gave two reasons for this. The first is that student work examples often fall under the category of supplemental materials. Applicants are allowed to submit supplements, but because they are not required there

is no guarantee that they will be reviewed. The limited time available to review applications means application readers focus their attention on required materials.

The second reason for why application readers do not review student work examples is that they do not believe they have the expertise to accurately judge the quality of the work. This is the idea that admissions officers felt evaluating student work for the quality of the work and doing so fairly requires a background in the topic of the student's work. For example, if an admissions officer has a background in creative writing, they felt they might be able to evaluate a student's poetry based on the principles of writing good poetry. Two approaches to evaluating student work examples for quality discussed by informants included the use of specialized admissions teams, such as a STEM team to evaluate STEM work, and the inclusion of faculty members in the admissions process. These solutions, however, seemed uncommon, and relied on standardized submission guidelines such as the use of standard intake forms or standard guidelines dictating what is and is not acceptable evidence. One of the reasons for standardization is that it allows for a fair comparison of student work. Admissions officers felt it would be unfair to compare a painting to a musical performance because the standards of quality may be entirely different. In other words, it is very difficult and perhaps unfair to compare apples to oranges. For student work examples to be evaluated for quality there need to be standard criteria that align specific signals of college readiness with specific types of student work.

Standardizing guidelines for the types of evidence that admissions offices will accept goes against the idea that alternative digital credentials are flexible *boundary objects* that youth can use to signal personal qualities (Fishman, Teasley, & Cederquist, 2018; Pitt, Bell, Strickman, & Davis, 2019; Martin, Gutierrez, & Muldoon, 2020). Alternative digital credentials like digital badges function as *boundary objects* within well-defined informal learning communities because

their meaning is locally negotiated (Casilli & Hickey, 2016). However, for credentials to scale, there needs to be some common and agreed upon understanding of their meaning outside of the communities in which they were developed (Olneck, 2015). A focus on evaluating student work examples for the quality of the work would likely be impossible based on the amount of additional time it would add to the process. It would also likely require very specific instructions on what should and should not be submitted as evidence. This would almost certainly mean that those students who lack access to the necessary resources would be at a significant disadvantage. A focus on reviewing examples of student work as signals of interest and personal qualities like intellectual curiosity is likely to be a more efficient, accessible, and equitable approach.

Like Stevens (2007), I found that the "narrative raw material" gleaned from the informants' personal experiences with applicants, their teachers, and guidance counselors played a significant role in how applications are evaluated. However, where Stevens described the inequities involved in how this information is produced, the informants in my study provided positive stories about how having personal insight into what was happening in a high school or in a student's life during COVID-19 became a necessary support for interpreting extracurricular engagement. In addition, they also discussed how having an understanding of the availability of extracurricular opportunities within a community and an understanding of the physical landscape allows application readers to form an impression of personal qualities like effort and commitment to an interest.

Relying on personal knowledge or experience is not a system, however. Whether or not an application was read by an admissions officer that had personal knowledge of the applicant's community was, in some instances, just luck of the draw. Codifying this information into an alternative digital credential would mean that contextualizing extracurricular engagement would

no longer be based on luck. Ultimately, it seems possible that aggregated data from digital badges should be used to visualize the availability of learning opportunities within larger communities (Pinkard, Erete, Caitlin, Majors, & Walker, 2025). The metadata standards of digital badges require the collection of information about where and when learning activities happen. This information could be used to visually represent the available learning opportunities within a specific community. Future research should examine how the concepts and practices of opportunity landscaping, particularly data visualizations of learning ecosystem health, can inform research on using alternative digital credentials to support career and educational pathways. At least one participant in this study expressed a desire to have neighborhood-level data on the distribution of extracurricular opportunities within a municipality.

The inclusion of contextual information with alternative digital credentials is likely to have currency with both selective and accessible admissions, as well. With selective admissions, the inclusion of information on the availability of extracurricular opportunities, whether formal or informal opportunities, may help admissions officers make fine distinctions between applicants with relatively similar profiles of alternative digital credentials. This may help address concerns about alternative digital credentials contributing to the existing arms race (Fishman, Teasley, & Cederquist, 2018). It may also allow admissions officers to evaluate the credentials within the context of the individual applicant as opposed to evaluations based on subjective comparisons of which applicant's profile of credentials has the most value. In other words, providing context on the availability of extracurricular opportunities may help admissions officers see exceptionalism from the perspective of the applicant. It would help represent students' experiences in a way that makes them stand out as distinct from other applicants.

To bring context into the evaluation of informal learning we need solutions for transforming digital badge metadata into "opportunity landscapes" (Pinkard, 2023; (Pinkard, Erete, Caitlin, Majors, & Walker, 2025). Future research should examine the efficacy of different approaches to collecting this information alternative digital credentials while maintaining input from people from within the community. One approach could see credentialing platforms used to collect and report information on the availability of extracurricular opportunities and resources and records of youth participation at the group level. Another approach might be to help youth actively collect and report information about the perceived value and significance of the available opportunities within their communities. Representing extracurricular opportunity from students' perspectives could be seen as a more reliable picture of what is and is not a meaningful extracurricular experience. However, there is also the possibility that this would allow more privileged applicants to downplay the availability of extracurricular opportunities in their communities. Ultimately, a third-party system for credentialing informal learning opportunities might provide neutrality. However, should neutrality be our goal? The existing college admissions infrastructure is meant to be a neutral system, but research clearly demonstrates that it is not. In every aspect of the admissions process, wealth tips the scale to those already well position for admission to elite higher education institutions. If our goal is simply to encourage pathways into higher education, a focus on using alternative digital credentials to help marginalized youth see college readiness in themselves will likely have a meaningful impact. But if our goal is to address imbalances in terms of who is represented at the most elite institutions, a technical infrastructure alone is likely to be insufficient. What is also needed is a social infrastructure that promotes access to substantive informal learning experiences, because these

are the experiences that send the strongest signals of college readiness at the most selective institutions.

### 5.3 Limitations

The main limitation of this study is its small sample size of twelve informants which limits the ability to make broad generalized claims about how informal learning is evaluated as part of holistic review. What this study provides are specific cases of how admissions officers at three different types of higher education institutions described their approach to holistic review. These cases inform our understanding of how the affordances of alternative digital credentials might support the evaluation of informal learning experiences. The small sample size means it is difficult to attribute variation in how admissions officers reported evaluating informal learning experiences to institution-specific priorities and constraints. It may be the case that informants responded based on their own personal beliefs about the value of informal learning experiences to their admissions processes rather than the value their institution places on informal learning experiences. The distinction between personal belief and institutional policy is important because it is a difficult task to design alternative digital credentials to meet the needs of individual application readers. Understanding how institutions prioritize informal learning experiences as part of their admissions process may be obtained through a content analysis of training materials as well as observations of training sessions. Research on alternative digital credentials as tools for evaluating the knowledge, skills, and abilities of real applicants is sorely needed. The study described in this dissertation, and the related work upon which it is based (Fishman, Teasley, & Cederquist, 2018; Pitt, Bell, Strickman, & Davis, 2019; Martin, Gutierrez, & Muldoon, 2020), provides insight into the potential of alternative digital credentials to transform college admissions but this potential has not been put the test. As alternative digital credentialing

systems mature and become part of the admissions infrastructure it will be a necessity to examine their use in real world or simulated admissions decision-making processes. This line of inquiry will provide needed insight into the relationship between the unique features of alternative digital credentials and their potential to support college access.

Another limitation is that findings are based on reports of how informal learning is evaluated rather than observations of how informal learning is evaluated. There were a number of factors that made direct observations impractical, however. The first is the nature of the admissions cycle and the timing of this study. I recruited informants for this study starting in the spring of 2022, well before the typical time for application review which begins in mid to late autumn (Stevens, 2009). Recruiting informants in the spring and summer meant observations could only occur with informants from access-driven institutions who reported reviewing applications on a rolling basis. Observations likely would have required additional clearance and coordination with informants' supervisors which would have further complicated the recruitment process and potentially further limited the sample size.

The potential for social desirability bias is another limitation to this study. It is an understatement to say that college admissions processes are a controversial topic. It is an issue that has been litigated in the highest court of the United States on multiple occasions spanning over 75 years of American legal history. It is more than a question of what factors predict college success; it is a question of how our higher education institutions define merit and attribute value to some experiences and not others. Even though efforts were made to protect the identity of informants, some admissions officers may have been reluctant to be entirely forthcoming with their responses out of a desire to reduce risk to themselves and their employers. In my interviews, I found this reluctance expressed in two different ways. The first was through

informants' reluctance to share documents and evaluation tools with me when I requested to see them. The second way involved prospective informants who either turned down the opportunity to participate in the study or simply ignored my requests for interviews. Some turned down my request citing institutional policies that prohibited them from discussing their work outside of their office while others gave no reason at all—they simply ignored my request. While I cannot say exactly why some informants ignored my requests for interviews, the fact that some institutions do in fact prohibit their admissions officers from discussing their work underlines how important it is for some institutions to obscure their methods for reviewing applications and the value they place on some experiences and not others.

### 5.4 Summary

The findings from this study both align with and add additional context to what is known about the holistic review of nonacademic factors in college admissions. Based on the comments of the informants in this study, the evaluation of nonacademic factors is a highly subjective process that draws on information from a variety of sources including information not specifically included in the application itself. There are, however, specific types of signals that application readers rely on in applications, and therefore alternative digital credentials should be designed to amplify these signals. Finally, future research needs to explore mechanisms for adding additional context to digital badges. Existing design work related to informal learning, such as opportunity landscaping, provides a useful starting point for envisioning what a system for contextualizing extracurricular opportunity might look like.

# Chapter 6

## Conclusion: Towards a better system

Research on this project began in 2022 but the groundwork was laid in 2018 at an NSF workshop exploring the potential of using alternative digital credentials (microcredentials) to support college access (Fishman et al., 2018). This was well before the SCOTUS decision in *SFFA v. Harvard*. The motivation for the workshop then, as it is still today, was the reality that elite higher education remains an option for only a select few, application review processes remain opaque, and our belief that the methods of determining who merits access to these institutions continues to reinforce economic inequality. The decision in *SFFA v. Harvard* came in the middle of this dissertation project. The decision gave the project a new sense of purpose, underlining the urgency of finding new solutions to supporting college access. This dissertation has proposed alternative digital credentials as a potential solution to these problems. Findings from this study suggest there is good reason to believe that alternative digital credentials can support college access, particularly as part of a holistic review of college applications.

As it is practiced now, holistic review allows us to think more expansively about what it means to be college ready. But given the subjective nature of the process, and the potential for making higher education even less accessible to those who most stand to benefit from it, it is necessary to continue to investigate ways in which holistic review can be improved. Alternative digital credentials provide practical solutions, many of which I have outlined in this dissertation. Alternative digital credenials may help youth discover, explore, and deepen interests making

them more ideal candidates for admission. Alternative digital credentials may also help youth clarify and define their educational and occupational goals, thereby helping them translate their interests and experiences into the language of college admissions (Martin, Gutierrez, & Muldoon, 2020). The *Skills for the Future* initiative (Liu, et al., 2023) has the potential to make these ideas a reality. But reason to believe that change is coming does not ensure that change will bring something better. Our focus needs to remain on creating access for those who are most frequently excluded. While it will be necessary to continue to work with admissions officers to understand the ways in which alternative digital credentials improve the legibility of informal learning experiences, a singular focus on making the admissions process less subjective, while important, is likely to fall short of bringing real transformation to the admissions process. If anything, it may help the rich get richer.

There are a number of ways in which alternative digital credentials can contribute to improving pathways into college for marginalized youth outside of supporting the evaluation of informal learning and nonacademic factors. While research on the use of alternative digital credentials in admissions has made a number of recommendations about how these tools can contribute to a more fair and equitable system, researchers have envisioned alternative digital credentials primarily as a reporting tool much like the academic transcript is today. A system that merely replaces grades and standardized test scores with digital badges is not a new system. But which alternative digital credentialing features would an ideal system emphasize? In addition to improving the legibility of hard to define personal qualities, alternative digital credentials need to be part of a larger infrastructure designed to support youth and their families to navigate the larger and more complex process of college and career planning.

Finally, time-and-time again, college admissions offices in this study emphasized the importance of their personal experiences with applicants and applicants' communities to their evaluation of a college readiness. As they are used now, personal qualities and extracurricular learning experiences function poorly as *boundary objects* because youth struggle to communicate the value and meaning of these experiences through writing. But they also function poorly as *boundary objects* because interpreting them is highly subjective. To address this issue, there needs to be opportunities for admissions officers, informal learning providers, and youth to negotiate the meaning and value of these experiences to college readiness. Ultimately, recruitment networks and other means of building connections between providers of informal learning experiences in under-resourced communities and college admissions offices is likely to have a lasting impact on building pathways between learning outside of school and higher education. It is in these face-to-face interactions and connections with youth and their families where advocacy for their inclusion in higher education begins. Exactly how alternative digital credentials can play a part in establishing these types of networks is still unclear, but it is the necessary and worthy next step toward a more ideal system that supports college access for all students.

# Appendices

## Appendix A: Phase I recruitment email

Hello ------

My name is Steve Cederquist. I am a doctoral student at the University of Michigan's School of Information, working on the Mastery in Out of School Time (MOST) Transcript project with Professor Barry Fishman. You were initially contacted about this project by Derek Kindle of the University of Wisconsin. Thank you for agreeing to take part in this project. I would like to find some time in the next two weeks (May 10 - May 20) to schedule an interview with you. The interview will take approximately one hour, will occur over Zoom, and will be recorded with your consent.

To help me schedule a meeting, can you please respond to this email with your general availability for the next two weeks or a preferred date and time? Once we find a date and time, I will send a calendar invitation with a Zoom link to confirm.

Thank you again for agreeing to be a part of this project. Should you have any questions, please feel free to contact me. I look forward to meeting you.

Sincerely,

Steven Cederquist

# Appendix B: Codes with exemplar quotes

Table 7. Codes with exemplar quotes

| Code | Exemplar quote |
|---|---|
| Signals of fit | But yeah, we are really looking for students to, in their file, portray intellectual curiosity and kind of community-oriented . . . a community way that fits Bridgewater which is very collaborative, where students have to live for at least two years but typically four in a residential college suite setting. So, we're really looking for that kind of personal fit in our classrooms in our residential halls and kind of in the community. [Norah O'Brian] |
| Contextualizing informal learning | And then, sometimes there are students from rural areas, but they have gone above and beyond, to just get one experience and you know that it took them that much more work because they didn't have the resources and they're first-generation students. So, that also factors and that's why I was saying, so that student might be, you know competitive for position in this program because it also talks about their resiliency and their ability to find an opportunity, on their own as opposed to someone who may have been given a list of here's all, here's 20 opportunities, you need to apply for them and we're going to help you apply and I'm going to write you a letter of recommendation that kind of thing yeah. [Kayla Smith] |
| Holistic Review | So, when I'm reader number one [the first reader of an application] I'm trying to look at the transcript first, I'm trying to situate that person where they fall in their class, against the school profile, school profiles are big for me. And as you know, some schools take their school profiles seriously, some don't, and that can be really problematic in terms of holistic review. [Michael] |
| Academic fit | And not and not every case, are we going to admit somebody like this, you know, there may be times when we're going to say you know the academic performance is simply too low. [Bill Alton] |
| Nonacademic fit / NAF | We actually use the William Sedlacek book, and we took a look at non-cognitive variables, and so we embedded that in the types of essay questions that we asked, as well as the academic evaluation [Kayla Smith]. |
| Relationality | So, if I'm having a conversation with [an applicant] which I typically do, even though not necessary, I'll say, "Hey, what's been going on in ninth grade, or what was the scenario like, what's this trend look like for you, or how senior you might I don't have. But tell me how you think it's going, especially if they are grades, are below requirements." So even just giving more humanity to the number I see is helpful when I send that to committee and say, "Hey, here's the context: The student change schools, or actually the dealing with Covid." So, I'll put those in the review, so that they can have some information. [Ada Wallace] |
| Essays | I think the choice of [essay] topic can also tell you something as here's a student who didn't think this through well. And sometimes you can see that in the execution. I think you can see good critical thinking in how a student takes a topic and what they do with it. You can take the most mundane topic and really write a great essay and that's going to show that you're prepared for this or thinking differently about topics. [Marvin Emory] |
| Maximizing Opportunity | And so, if they avoided, if they have some opportunities to take STEM courses or other types of science and math courses or computing courses, and they did not avail themselves to that, |

| Code | Exemplar quote |
|---|---|
| | we kind of know that; we looked for that. In other words, we don't want someone just taking all the easy courses in high school, you know. And we'll just say, for purposes of discussion, the 4.0 GPA student. The perfect grade point average. [Peter Jackson] |
| COVID-19 | I do think, though, COVID itself has had some other impacts, and that is because COVID hit the entire country but not evenly in terms of activities and behavior or whatever it's really. This is where I was saying I'm very grateful that we have regional and high school level readers who can understand what's going on in an area. So, if you were a student in [county name removed] county, you are likely in a remote environment for a long time. Definitely have mask mandates etc. Most out of school activities were not available to you in the in-person form which, for the most part, would include sports, right. And that's a big deal. If you were one county away none of that applies. You were still in person, you still got to do everything. [John Green] |
| Access to learning resources | I come at this with the lens of someone who spends 90% of my time working with diversity recruitment and again for low-income rural students or minority students. I know from my experience, especially with rural students, there are schools around the country where they might have four extracurricular activities. When I covered Turkey for many years, internationally women in Turkey aren't allowed to basically do anything so they had two activities. But counselors have written to me to say like this is so impressive I don't know how they did it and they had two things that they were involved in right. [Norah O'Brian] |
| Standardized materials | We have a STEM team because we don't know what's going on in some of those files, so we want some opinions there and we have people that just really know music and the arts well so maybe it's going to hit their caseload and maybe it's just someone who's reading from across the country. And it's pretty random at that point, but we're getting that national perspective versus this student looks really strong in Nevada we want to know how they look at our pool at large, after that. [Norah O'Brian] |
| Digital Credentials | So, the challenge with something like this mastery transcript is it takes time to read it right because it's more detailed it's more comprehensive. [Noelle Cassidy] |
| Institutional priorities | That's when we have to start to say how are we going to craft this class, how are we going to make sure that we have you know enough players for our football team. You know, or how we're going to make sure we have enough people who are interested in what, we don't really admit to major, so it doesn't matter. If we only have three people who say they want to do biology we're going to admit those students, because they might change their mind but we're looking to see what else they're going to [do] what else they want to do on campus, what else they're interested in. [Marvin Emory] |
| Substantive engagement | I am amazed by the students that we see applying for admission to this program and the types of experiences that they have as high school students. Like, you don't see some college students with that type of experience. So, if it's something like the student volunteered at the hospital reception desk, that's not the same as a student who shadowed an anesthesiologist and had a chance to participate in, you know, surgeries or reviewing X-rays or doing cancer research. So, I would say that it has not been challenging to differentiate between what is more of a substantive experience and one that's just kind of nominal, for lack of a better term. [Kayla Smith] |
| Rules applicants out | So outside of the basic requirements I think what we've seen is as we're becoming more selective, applications that look very curated typically will rule someone out. So, there are a lot of applications that are a little too tight right like they are really curious. You can probably tell there's been a lot of assistance, a lot of paid assistance and curating not just the essays but in the extracurricular activities, the order in which they were taken. It just looks incredibly curated and those we are less interested in. I won't say it's a clear no but over time it's becoming more and more of a "no" [admit]. [John Green] |

| Code | Exemplar quote |
|---|---|
| Perseverance | A lot of it is for me and for my colleagues it's how does a student bounce back, you know? Certainly, we look at that first from an academic standpoint, but then we also say how do you bounce back in your life. Are you making strides to do better for yourself? And not in every case are we going to admit somebody like this, you know. There may be times when we're going to say you know the academic performance is simply too low. [Bill Alton] |
| Corroboration | [Application review] requires the admissions officer to have so much training and to read between the lines, and like look at, look for this, and so many ways. It's like, things that are on this transcript I'm looking for and letters of recommendation and the descriptions of the activities and essays and which is good to be looking at all that but it's like, I'm piecing together a lot of little information because the transcripts do tend to be so minimal, I guess. [Noelle Cassidy] |
| Direct admit STEM | [The applicant is] like, I really like the science part of nursing, or I like the bedside manner. So, if they like the bedside manner, it's more like, okay, well, have you ever considered psychology, right? If you're trying to help people uh with that, because nursing is way more than just bedside manner. Right? We've had nursing students where they don't like, where they don't like blood, and it's like, Wow! You might want it to reconsider nursing. They've never considered wiping a butt. [Aaron Rodric] |
| Non-standard materials | So usually, we don't have time [to look at supplemental materials], and the challenge is if it doesn't fit into the constraints of what we've asked for it. So, like students would often email me especially if they were waitlisted, they would email me and be like, 'I want to send you this research paper I wrote,' and I would like rarely open those because we're not allowed to take that into account because it wasn't a part of the application. And again, it's not really fair because, like rural first gen low-income students of color like they don't know to send extra stuff like that, like they're not sending supplemental materials in ways that students from well resource backgrounds are. So, we usually don't consider supplemental materials, if anything, it's just like for fun like I'll open the website and be like oh look at this cute little food blog. [Noelle Cassidy] |
| Training | I don't think we're there yet, so much so, to say that we could take it [sic]. Because the idea is, we would have to train 143 to 150 people to say like well how many of these do you want to take, and in what programs, and to what extent? And that's a big thing to scale and typically that's done by institutions over a very long period of time where they're just able to demonstrate you know, through those key measures that they're going to be solid almost no matter what right. [John Green] |
| Academic-Career Goals | But if we see a kid who says, I want to major in chemistry, and they don't have those things that's not going to be a strike against them. [Marvin Emory] |
| College Board Landscape | [The College Board's Landscape dashboard] is just, it is so helpful. You will see, you know, apples to oranges, you know, comparison of kids and the socioeconomic level that they're coming from and both their home address and also the high school community. That is certainly helpful but doesn't address again sort of what happens outside the four walls of a classroom when it comes to extracurriculars. [Michael Lucas] |
| Leadership | I think most high school students aren't yet trained to think about leadership. Beyond formal leadership roles. And so even though we try to encourage that, like when I met with students, I would say like, just because you're not the president of NHS, like maybe you took the lead on this specific, you know, car wash and you were the one who helped set it up. Like, can you think about times that you demonstrated leadership, but I feel like most high schoolers only think about leadership in terms of like those formal club positions that of course is really easy on paper. [Noelle Cassidy] |
| Reflection and meaning making | I think that you will hear this a lot from people is that students don't understand that they, it doesn't, like the topic doesn't actually matter. It's about the reflection on the topic that they |

| Code | Exemplar quote |
| --- | --- |
| | have done so I think everybody thinks that the trick to a good essay is having like the most interesting story and it's really not I mean, I think that the probably the best. [Olive Wesley] |

# Appendix C: Mastery Transcript credit distribution

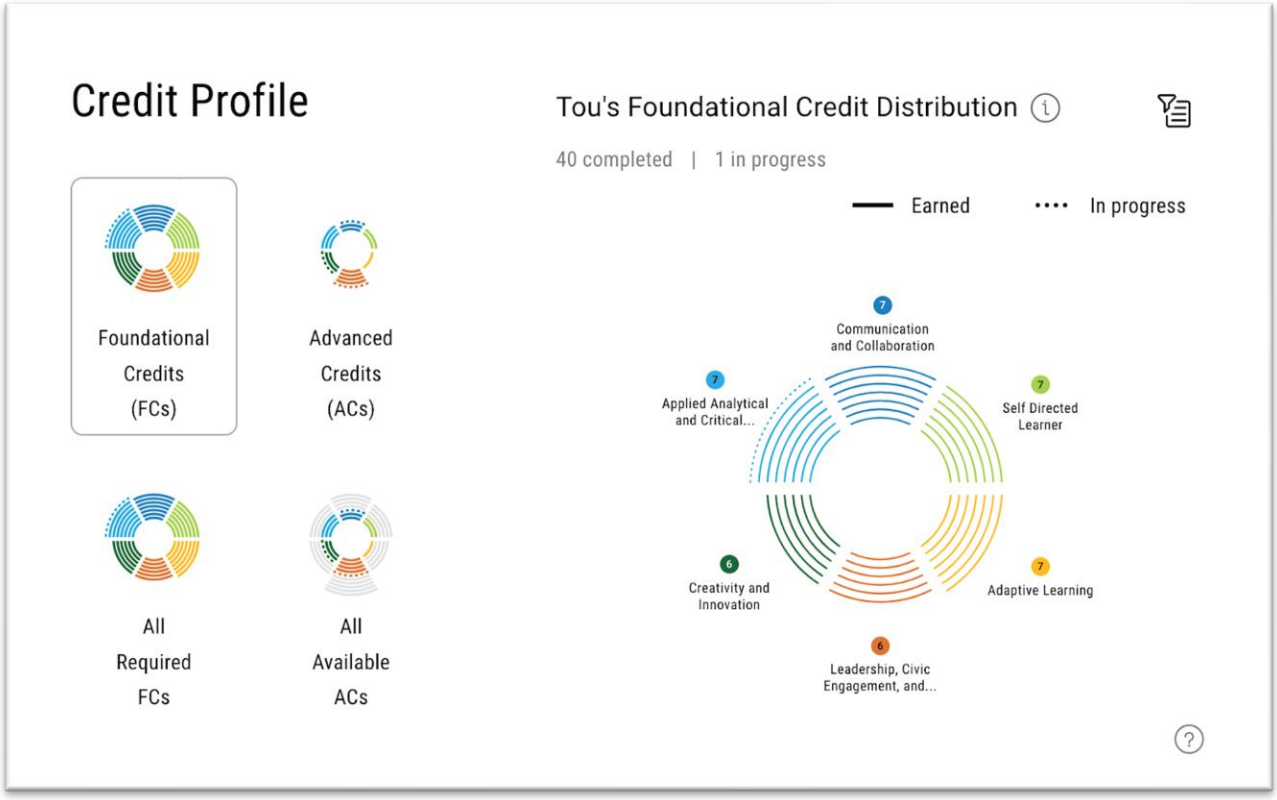



Figure 2 Mastery Transcript Credit Distribution

# Appendix D: Opportunity Landscape Dashboard

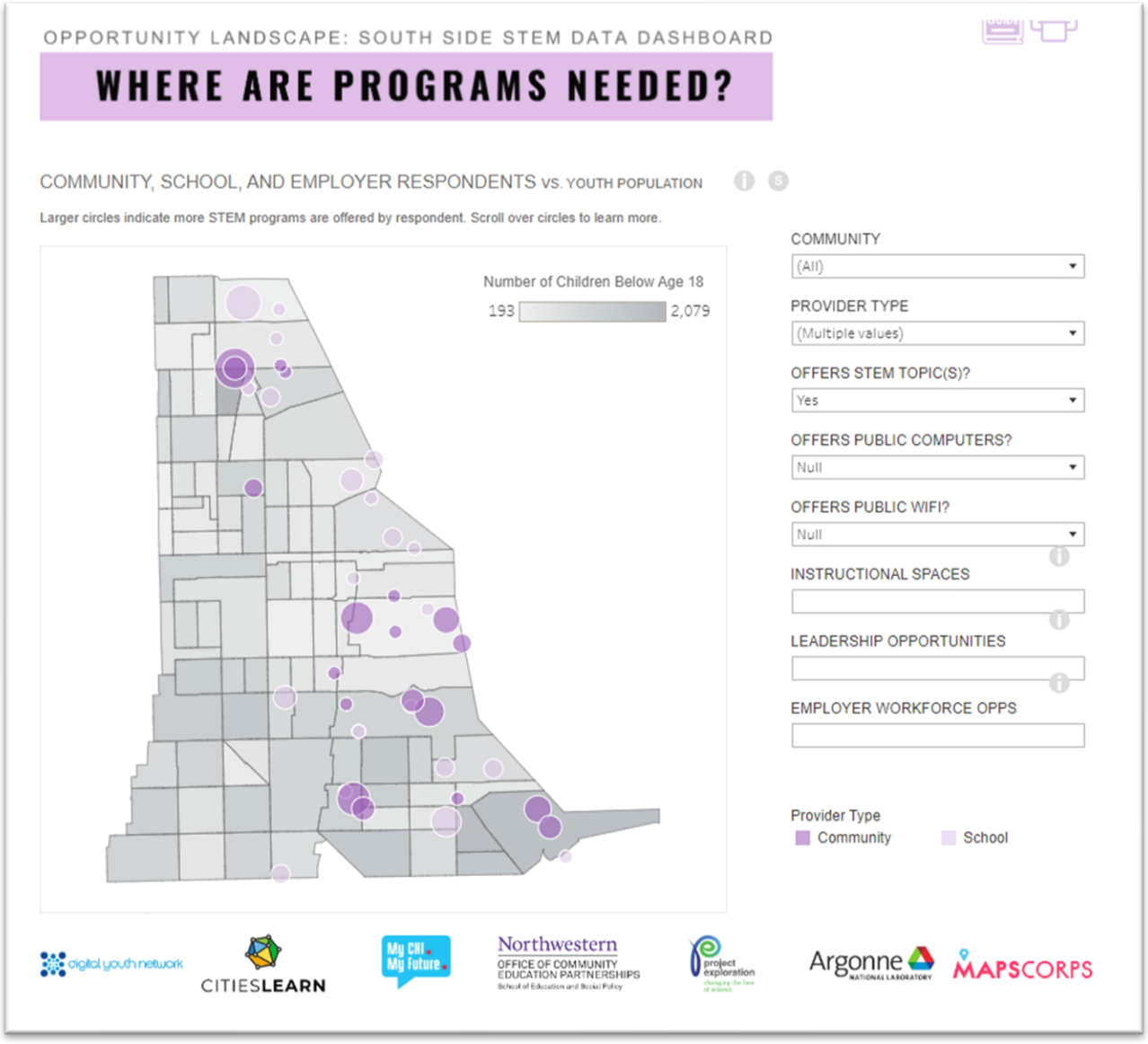



Figure 3 Opportunity Landscape Dashboard

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