Portfolios are increasingly common in higher education, and are now used on more than half of U.S. college campuses. As higher education adapts to the pressures of the twenty-first century, the capacity of ePortfolio practice to enhance integration and make learning visible can further elevate its value. Yet key elements of effective ePortfolio practice are often overlooked; as a result, many campus ePortalio initiatives struggle. To realize its potential, the field must gather and examine evidence of ePortfolio’s impact on student learning and generate clear frameworks for effective practice.

This book directly speaks to these needs. It draws on the work of the Connect to Learning (C2L) network, 24 teams from campuses with sustained ePortfolio projects engaged in a national community of practice. It analyzes C2L campus data on the benefits of ePortfolio practice for students, faculty, and institutions, generating three evidence-based value propositions. It also offers the Catalyst Framework, a linked set of campus-tested strategies for building an effective ePortfolio initiative, connecting effective pedagogy to professional development and outcomes assessment. In doing so, it aligns effective ePortfolio practice with the framework George D. Kuh, the Association of American Colleges & Universities (AACU), and others have developed for educationally effective High-Impact Practices.

This chapter begins by briefly reviewing the history of ePortfolio practice. It summarizes the evidence gathered by the C2L project, introduces the Catalyst Framework, and positions ePortfolio practice as a high-impact practice for student learning.

Connect to Learning: ePortfolio Value Propositions

Findings from C2L revealed three mutually reinforcing value propositions of the benefits of ePortfolio practice done well.

1. ePortfolio practice done well advances student success.
3. ePortfolio practice done well catalyzes learning-centered institutional change.
ePortfolio in the growing literature related to educationally effective High-Impact Practices.

**A History of Growth**

The spread of ePortfolio practice in twenty-first-century higher education has been rapid but uneven. Growing numbers of colleges and universities offer ePortfolio services. Hundreds of thousands of students use ePortfolio each year. The proliferation of ePortfolio vendors, journals, networks, and conferences is striking. Yet in educational technology circles, ePortfolios are often seen as passé, and many campus ePortfolio projects struggle to grow beyond the pilot stage. While the field has progressed in significant ways, broad understanding of ePortfolio practice is still limited.

Portfolios have deep historical roots. Disciplines such as writing and architecture have long used portfolios to collect student work and present a curated demonstration of skill and accomplishment. Sophisticated practitioners understood that this process created opportunities for self-critique and the development of reflective practice. In the 1990s three developments energized the transformation of portfolio practice. First, new research in learning science spurred the growth of learner-centered and constructivist pedagogies, demonstrating that students learn best by doing and creating, connecting new knowledge with previous frameworks of understanding. Bransford, Brown, and Cocking's magisterial synthesis of this research highlighted the crucial learning role of reflection or metacognitive thinking. This research literature and cognitive as well as the noncognitive or affective elements of student learning and growth, such as grit and resilience.

Second, the digital revolution empowered students to create and share collections of text, images, and multimedia artifacts. Although ePortfolios emerged as part of what was later called Web 1.0, they in some ways anticipated Web 2.0 by focusing on user-generated content.

Third, federal agencies and accreditation bodies spurred new attention on assessment and accountability, the measurement of student learning. The movement to advance authentic assessment took an important turn, and colleges and universities nationwide began to look for ways to satisfy assessment pressures.

These developments fueled the emergence of ePortfolios as a multifaceted practice that links digital technology with reflective learning, integrative pedagogy, and authentic assessment. A handful of educators saw the broad potential of ePortfolio as a student-curated collection of learning artifacts and reflections, which together made a student's learning visible to the student and to others. In 2002 Trent Batson noted with some surprise: The term "electronic portfolio" or "ePortfolio" is on everyone's lips. We often hear it associated with assessment, but also with accreditation, reflection, student resumes, and career tracking. It's as if this new tool is the answer to all of the questions we didn't realize we were asking.
the future, some observers have predicted, students will use digital tools and systems to "learn everywhere," not from a single university but from a variety of education providers, scattered across the country and around the globe.

The future of this upheaval is not yet clear, but change is inevitable. To the extent that higher education becomes in some way "unhanded," that learning occurs in and beyond the walls of the classroom, ePortfolio practice can help students connect and synthesize those learning experiences. Linking learning in diverse settings, ePortfolio can support more integrative processes of reflection and assessment. In the emerging educational ecosystem, effective ePortfolio practice can link digital badges and learning analytics to broader structures for student, faculty, and institutional learning. At a time when many forces are fragmenting the educational experience, what we discuss as next-generation ePortfolio practice has the potential to create opportunities for strengthening connection and meaning.

What is ePortfolio for Faculty and Staff?
LaGuardia Community College defines ePortfolio for its faculty and staff as the following:
- For faculty, staff, advisors, and the institution, ePortfolio practice asks questions such as the following:
  - Who are our students?
  - What experiences do they bring to the college?
  - How can I see and better understand their patterns of learning and growth?

Done well, ePortfolio practice makes learning visible across boundaries and over time. As students tell their stories, they help faculty understand who sits in their classes, and how their classes connect with each other.

As students craft plans for education and careers, they create opportunities for faculty and staff advisors to offer deeper, more informed guidance.

Moving past standardized tests, students’ ePortfolio work helps degree programs assess their own impact and helps an institution become a more integrated and adaptive learning organization.

A Promise Not Yet Realized
Despite growing use of ePortfolio and its emerging role in the new learning ecosystem, the full promise of ePortfolio has yet to be realized. Campus ePortfolio projects confront multiple challenges, from choosing the right platform to providing technical support, building faculty engagement, developing effective pedagogy, and balancing conflicting goals. There is a deeper issue as well: ePortfolio initiatives require coordinated efforts on multiple fronts, cross-institutional collaborations that can challenge long-standing assumptions. As a result, many campus ePortfolio projects have been short-lived; others have survived but never thrived or gone to scale.

Part of the problem is that many campuses have launched ePortfolio initiatives with limited understanding of effective ePortfolio practice. Many colleges approach ePortfolios as a technology and fail to grasp that their value depends on sophisticated pedagogy and institutional practice. Campuses lack access to comprehensive discussions of implementation issues and well-organized collections of campus-tested practices. They have no guide to help them plan the complex effort needed to achieve success.

This is a significant gap in the field. Although the ePortfolio field has matured, no comprehensive framework has yet emerged to guide the design of ePortfolio initiatives. There is a need for an overarching conceptual structure that embraces the complexity of ePortfolio initiatives, the strategic potential of their integrative nature, and the rich and evolving nature of ePortfolio itself as an emerging set of practices.

Another gap has also hobbed ePortfolio development. ePortfolio practitioners have produced surprisingly little evidence regarding ePortfolio’s role in student learning. Bryant and Chitrum reviewed the research literature and found a striking paucity of hard research; of 118 articles on ePortfolio published in peer-reviewed journals between 1996 and 2012, they found that most were descriptive or self-reporting in nature. Only 13% of the articles they reviewed provided empirical evidence related to student outcomes, and less than 2% used measures Bryant and Chitrum considered reliable and valid.

Although legitimate questions could be raised about Bryant and Chitrum’s categories and methodologies, the broader point is indisputable. Up until now, relatively little data have been published on the role of ePortfolio experience in shaping student outcomes such as learning, retention, and completion. In an era of tight higher-ed budget cuts and increased attention to student completion and accountability, the need for evidence of impact is only growing.

Fortunately, new evidence is now emerging. The C2L network gathered evaluation evidence from multiple campuses, showing strong correlations between ePortfolio experience and improved student learning and success. C2L campuses also worked together to generate a comprehensive framework for effective ePortfolio practice. C2L findings can support educators nationwide, and those findings are the basis for our claim that ePortfolio is a High-Impact Practice for twenty-first-century learning.

The Connect to Learning Project: A Community of Inquiry
Active from 2011 to 2015, the C2L project brought together teams from 24 campuses nationwide to respond to questions confronting the field: What difference can ePortfolio make? Can an ePortfolio initiative improve student learning? Does ePortfolio-based outcomes assessment really work? Is ePortfolio worth an investment of institutional resources? What evidence demonstrates the broader value of an ePortfolio initiative? What strategies have produced success for students and institutions?

Supported by a grant from the Fund for the Improvement of Post-Secondary Education (FIPSE), C2L assembled 24 institutions with established ePortfolio projects into a national community of practice. Engaged in a recursive knowledge-generation process, partner campuses represented a cross-section of higher education, from community colleges to Research 1 universities, ranging from Boston University...
The Difference ePortfolio Makes

Each C2L campus team was asked to gather local evidence about the effectiveness of ePortfolio practice. Teams focused on student learning and success, but made choices about how to measure it, using indicators appropriate to their campus and students.

analytical essays form a jointly created website titled Catalyst for Learning: ePortfolio Resources and Research (C2L.mcmrc.org). This book draws on that site to make a narrative argument and provide a book-format resource to the field (see Figure 1.1).

to San Francisco State, IUPUI, and Three Rivers Community College. C2L was coordinated by the Making Connections National Resource Center of LaGuardia Community College, in partnership with the Association for Authentic, Experiential, and Evidence-Based Learning. LaGuardia’s associate provost for academic affairs, Brett Eynon, was the project’s principal investigator; Laura M. Gambino, associate dean for assessment and technology at Gunman Community College, was the C2L research director. Judit Torkol helped manage C2L. George-town’s Randy Bass and Stanford’s Helen L. Chen served as C2L’s senior scholars. C2L used a hybrid community-building model that integrated online conversations and face-to-face meetings to link teams as they explored the literature, exchanged practices, and expanded their campus ePortfolio projects. Some campus projects reflected local needs. Some teams focused on a few disciplines, such as education, nursing, or art history; others used ePortfolio campus-wide, sometimes tied to general education. Many C2L teams linked their ePortfolio work with first-year seminars and capstone courses.

Each campus team built a portfolio to represent its ePortfolio story. These portfolios and a set of cross-cutting

They all used a common survey instrument, the C2L Core Survey, that included questions used with permission from the National Survey of Student Engagement (NSSE). They shared annual reports analyzing the local impact of ePortfolio on teaching, learning, and assessment.

The groundbreaking research conducted by C2L campuses represents a systematic, multicampus effort to examine the impact of ePortfolio practice can have on student learning and success, and it generated important evidence suggesting that sophisticated ePortfolio practice, or ePortfolio done well, makes a difference for students, faculty, and institutions. On multiple campuses, ePortfolio-enhanced courses demonstrated higher student success outcomes than comparison courses. Data on GPA, retention, and graduation showed similar patterns. Meanwhile, data from the C2L Core Survey suggested that ePortfolio practice engaged students in deep and integrative learning. Moreover, the impact documented by C2L campuses was not limited to students; it indicated that sophisticated campus ePortfolio practice can also advance faculty learning and institutional change.

The C2L findings can be summarized in three mutually reinforcing value propositions, previewed here and discussed fully in Chapter 8.
Proposition 1: ePortfolio Practice Done Well Advances Student Success

At a growing number of campuses with sustained ePortfolio initiatives, student ePortfolio usage correlates with higher levels of student success as measured by pass rates, GPA, and retention.

C2L campuses studied the role of ePortfolio in student success. A constellation of campuses, from Manhattanville College to IUPUI to San Francisco State University, presented evidence of ePortfolio-related student success such as retention rates and GPA data.

In the Douglas Women's College of Rutgers University, ePortfolio was introduced into a required first semester mission course in the 2008–2009 school year; student performance improved significantly. The students' average grade point average (GPA) in the course improved and, perhaps more important, so did their cumulative GPA across all courses.

At LaGuardia Community College, data from multiple years show that across disciplines, the one-semester retention rate for students in ePortfolio courses is an average of 0 to 11 percentage points higher than the rate for students in comparison courses. Students enrolled in ePortfolio courses also had higher course completion and course pass rates than students in comparison courses.

At Tunxis Community College, a year-long comparison between ePortfolio and non-ePortfolio sections of developmental English courses showed that ePortfolios had 3.5 percentage points higher pass rates and an almost 6 percentage points higher retention rate.

San Francisco State University integrated ePortfolio into the Metro Health Academy, a learning community for high-risk students. Data show that improved success rates at every stage, including a graduation rate 10 percentage points higher than university-wide averages.

Detailed in Chapter 8, these studies and others represent an emergent pattern and provide a suggestive body of evidence for the proposition that sophisticated ePortfolio initiatives can help campuses improve student success and meet the challenge of improved rates of graduation and completion.

We must note an important caveat: We recognize that the data from C2L campuses have limitations. Proving causal connections related to learning is always challenging. C2L teams did not have the capacity to conduct randomized control group studies. The network spanned diverse campus contexts, marked by differences in focus, purpose, and level of student preparation. Not all teams succeeded in mobilizing their campus institutional research team to conduct the study. While the C2L data are limited in rigor and consistency, they are nonetheless suggestive and intriguing.

Student learning experience. Advancing higher order thinking and integrative learning, the connective nature of ePortfolio helps students construct purposeful identities as learners.

To go beyond completion and begin to address issues of quality learning, C2L teams and project leaders worked with Stanford University researcher Helen L. Chen to develop a survey tool that would help illuminate the effects of sophisticated ePortfolio practice on the nature of the student learning experience. We incorporated (with permission) and adapted a set of questions from the widely respected National Survey on Student Engagement, along with specific questions about ePortfolio experience. Used on campuses across the network with a wide range of students (n = 10,170), the C2L Core Survey sheds important light on the ways ePortfolio practice can shape student experiences.

On questions about ePortfolio, wide majorities of students reported that building their ePortfolios helped them "think more deeply" about course content, "make connections between ideas," and become "more aware" of their growth and development as learners. They also demonstrated high degrees of engagement in what Laird, Shoup, and Kah have identified as a deep learning scale—synthesizing and organizing ideas, engaging in critical thinking, and applying theoretical concepts in unfamiliar situations.

Analysis of these data, detailed in Chapter 8, suggests that ePortfolio processes shaped by integrative social pedagogies help students make connections and deepen their learning. The data also suggest that ePortfolio practice done well helps students take ownership of their learning, building not only academic skills but also the affective understandings of self critical to student success. In this way, a sophisticated ePortfolio initiative can help educators address issues of learning quality without sacrificing success outcomes.

Proposition 3: ePortfolio Practice Done Well Catalyzes Learning-Centered Institutional Change

Focusing attention on student learning and prompting connection and cooperation across departments and divisions, ePortfolio initiatives can catalyze campus cultural and structural change, helping campuses and universities develop as learning organizations.

Although the first two value propositions focus on students, we found that effective ePortfolio practice had a broader impact as well, linked to faculty, staff, and institutional learning. The winds of change now swirling across higher education give particular importance to our third proposition. How can colleges and universities build their capacity to respond and adapt to changing conditions and new possibilities? How can administrators thoughtfully engage faculty and staff expertise to advance campus innovation focused on student learning? At a time when some argue that higher education should be "unbundled," how can campuses develop a shared purpose, a more concerted effort to advance student learning and development? How can colleges build learning cultures and become more integrated and adaptive learning organizations?
Addressing this challenging agenda, our third value proposition is based on stories and practices shared by the C2L teams that described their multifaceted work and how it reshaped campus culture. We found that the most effective C2L teams undertook a broad range of activities, connecting with faculty and staff in diverse sectors of the campus, from departments and programs to student life, institutional research and assessment, information technology (IT) and Centers for Teaching and Learning (CTLs). Bringing together diverse campus groups for collaboration focused on student learning, we found, helped campuses illuminate the holistic nature of student learning, foster integrative structural change, and build campus-wide commitment to organizational learning.

All three value propositions are explored in Chapter 8, on the Catalyst for Learning website, and in peer-reviewed articles. While still emergent, they represent an important first step in documenting the difference that ePortfolio can make in higher education. We encourage others to gather evidence that can confirm, extend, and refine these findings. As we move forward, such research will advance our understanding of ePortfolio’s multifaceted benefits.

What It Takes to Make a Difference: The Catalyst Framework

The C2L campuses also worked together to document and analyze the strategies needed to do ePortfolio effectively. While reading literature in the field, including the research on High-Impact Practices, they also reviewed and discussed each other’s practices. Out of this conversation emerged the Catalyst Framework (see Figure 1.2). By the project’s end, campuses were explicitly using the Framework to strengthen their own campus efforts.

The Catalyst Framework starts with classroom pedagogy, but it extends further. Because ePortfolio is most effective when it is implemented longitudinally and horizontally across disciplines and semesters, and because effective ePortfolio practice involves faculty and institutional learning as well as student learning, the Framework goes beyond the boundaries of the classroom. It speaks to not only the work of students and faculty but also that of departments and programs as well as broader institutional structures. Across these different levels of institutional life, we found that effective ePortfolio initiatives intentionally structure work in five interlocking sectors:

- **Integrative Social Pedagogy:** The theory and practice that guide the use of ePortfolio to support and deepen student learning, including practices related to ePortfolio for career and advisement. C2L focused particularly on practices that involve integrative learning and social pedagogy and centered on reflection as a key to deep learning.

- **Professional Development:** The active processes (workshops, seminars, online tutorials, and institutes) designed to help faculty and staff learn about ePortfolio technology and pedagogy and more effectively advance student learning and growth.

- **Outcomes Assessment:** The ways campuses use ePortfolio and authentic classroom work to support holistic assessment of programs and general education outcomes.

- **Technology:** The choices campuses make about ePortfolio platforms and related support mechanisms can have a profound impact on the shape and success of a campus ePortfolio initiative.

- **Scaling Up:** The planning, building, and evaluating of an ePortfolio initiative—the active role of campus ePortfolio leaders, and the way they work with students, faculty, administrators, and other stakeholders to build ePortfolio culture, allocate resources, and make the connections that can catalyze institutional change.

The Pedagogy sector of the Catalyst Framework is critical, and it is the area that has the most in common with the literature on High-Impact Practices. But C2L campus teams concluded that other sectors were also essential. No matter how effective their pedagogy, faculty acting alone in their individual classrooms cannot realize the full potential of ePortfolio practice. Broader institutional effort is required. The sectors of the Catalyst Framework suggest a way to conceptualize and organize that effort.
We found that work done in these interlocking sectors can be enhanced by attention to the three Catalyst design principles: Inquiry, Reflection, and Integration (I-R-I). C2I research suggests that effective ePortfolio initiatives use these principles in their pedagogy as well as other sectors, guiding the planning and implementation of activities campus-wide.

- Inquiry, or inquiry learning, is a well-developed pedagogy involving generating questions, examining evidence, and solving authentic problems. For students, ePortfolios can be understood as an inquiry into their own learning. In sophisticated ePortfolio-related professional development programs, faculty too are engaged in collective inquiry into practice. Programs and institutions use ePortfolio-based outcomes assessment as part of their inquiry into learning and teaching.

- Reflection, as understood by Dewey and others, stands at the core of deep learning and is key to processing experience and the generation of meaning. Guided reflective learning is widely understood as essential to powerful ePortfolio practice, and becoming a reflective practitioner is key to the success of ePortfolio-related professional development and outcomes assessment efforts.

- Integration, or integrative learning, engages students in connecting learning across time, space, and discipline, and developing the capacity to transfer knowledge and skill from one setting to another. Faculty and institutions as well as students must work to advance integration, thereby overcoming fragmentation and more intentionally applying insights and innovations to the broader process of building more cohesive and effective educational institutions. ePortfolios and outcomes assessment practices can be powerful processes in this regard.

To be used effectively as design principles, the overarching concept of Inquiry, Reflection, and Integration must be understood as connected, not discrete. Together they form a dynamic cycle, most powerful when recursive and ongoing. As design principles, they can inform the planning and execution of actions across sectors, deepening cohesive strategies on diverse fronts of a campus-wide ePortfolio initiative.

The Catalyst Framework can help campuses understand what it takes to do ePortfolio well. Building an effective ePortfolio initiative is a developmental process that must unfold over time. Because ePortfolio practice is most meaningful as a process of connection and integration, ePortfolio "done well" requires cohesive vision and design. The diversity of the Framework sectors suggests the necessary breath of the effort, and the Catalyst design principles help ensure cohesion and quality.

ePortfolio as a High-Impact Practice

The concept of High-Impact Practices is well established in higher education. Under the direction of the AAC&U, George Kuh and others have conducted, reviewed, and drawn on a wide range of educational research to identify a set of practices that when done well, "engage participants at levels that elevate their performance across multiple engagement and desired-outcome measures such as persistence." The AAC&U and Kuh codified a list of 10 practices that qualify. These teaching and learning practices "have been widely tested and shown to be beneficial for college students from many backgrounds." Evidence from multiple institutions shows these practices "have special benefit" on student outcomes such as engagement, persistence, retention, higher GPA, and graduation from college. Moreover, research shows they are particularly valuable for first-generation and minority students, helping them even more than they help traditional college students. "While participation in effective educational activities generally benefits all students," Kuh writes, "the salutary effects are even greater for students who begin college at lower achievement levels, as well as students of color, compared with white students."

In this book, we argue that ePortfolio should be recognized as a High-Impact Practice (sometimes abbreviated in the field and this book as HIP), along with first-year seminars, undergraduate research, and capstone courses. We believe that ePortfolio practice meets the criteria laid out in various HIP-related publications. The C2I data reviewed in Chapter 8 suggest that ePortfolio practice has been widely tested, shows a recurring pattern of benefit comparable to other HIPs, and meets other HIP criteria as well.

Key to the discussion of HIPs is the issue of implementation quality. As Kuh has written, "to engage students at high levels, these practices must be done well." Key to that implementation is making the essential elements, for example, of a first-year seminar "done well." These frameworks are crucial to helping institutions plan, launch, and sustain any given HIP. The Catalyst Framework establishes a "done well" structure for ePortfolio practice comparable to the equivalent structure for other HIPs. Extending from the classroom to broader institutional practice, the Catalyst Framework identifies a developmental process that can help educators develop and scale high-impact ePortfolio practice.

Finally, Kuh, O'Donnell, and others have argued that there is a set of key operational characteristics common to varying degrees across HIPs. No one HIP encompasses all characteristics, but all encompass some. As Kuh has written, "High-Impact Practices are developmentally powerful because they combine and concentrate other empirically validated pedagogical approaches into a single multi-dimensional activity
that unfolds over an extended period of time. Sometime termed behaviors or educationally effective practices, these traits can be understood as key dimensions of high-impact student learning experiences, the qualities that make HIPs high-impact. These include the following:

- performance expectations set at appropriately high levels
- significant investment of time and effort by students over an extended period of time
- interactions with faculty and peers about substantive matters
- experiences with diversity
- frequent, timely, and constructive feedback
- periodic, structured opportunities to reflect and integrate learning
- opportunities to discover relevance of learning through real-world applications
- public demonstration of competence

Throughout this book, we will demonstrate that high-impact ePortfolio practice embodies many of these characteristics. The core of ePortfolio practice is the act of making student learning more visible and connected, using the combination of guided reflection and networked digital technology. This core behavior aligns directly with two of Kuh and O’Donnell’s dimensions noted previously: periodic, structured opportunities to reflect and integrate learning; and public demonstration of competence. As we shall see, it also facilitates learning experiences along many of the other dimensions, including significant investment of time and effort by students over an extended period of time; experiences with diversity; frequent, timely, and constructive feedback; and opportunities to discover relevance of learning through real-world applications.

Throughout this book, we consider the behaviors facilitated by ePortfolio practice and how that in the context of the Catalyst Framework, looking not only at integrative ePortfolio pedagogy but also the key factors that support such pedagogy and the improved learning associated with it.

Done well, ePortfolio practice supports measurably improved student learning and success as well as the key behaviors common among HIPs. But doing ePortfolio well is more challenging than many educators realize. Planning, piloting, leading, and sustaining an effective ePortfolio project takes a careful understanding of what ePortfolio pedagogy looks like. It also requires attention to professional development, assessment, technology, and institutional support. The chapters that follow provide a sector-by-sector review of the Catalyst Framework, illuminated by an array of thoughtful practices developed, tested, and shared by C2L campuses.

Notes

1. Eden Dflipstrom, with D. Christopher Brooks, Susan Grajek, and Jamie Reeves, ECAR Study of Undergraduate Students and Information Technology, 2015 (research report) (Louisville, CO: ECAR, December 2015).


19. Ibid., 19.
20. Ibid., 20.