The Educative/Learning Portfolio: Towards Educative Assessment in the Service of Human Learning

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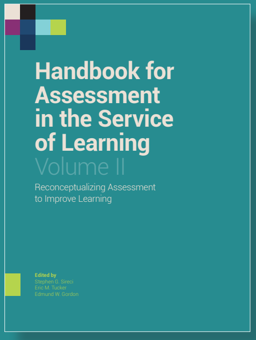

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Carol Bonilla Bowman and Edmund W. Gordon

Abstract
The Educative/Learning Portfolio: Towards Educative Assessment in the Service of Human Learning argues that our primary concern with portfolios should be their learning potential. The chapter documents generation, collection, and interpretation of pedagogically relevant evidence in search of student understanding. The portfolio processes of reflection, relationality, personalization and memorialization support enhanced motivation, engagement, effort, and metacognition. Portfolio learning is characterized by a caring, relational, and reflexive learning culture. The contents of the portfolio also provide a trove of in-vivo data that is then available for psychometricians and others, to distill for a variety of purposes.

Introduction and Rationale

In this chapter, we illustrate and elaborate on the concept of assessment in the service of learning. We propose a refocusing of our intention and vision of student portfolios from their use as an assessment tool (assessment portfolios) towards their intentional development as learning tools (educative portfolios). Assessment "in the service of learning" is a powerful concept, mandating one consider the assessment's learning value to the student first and foremost. Imagine how different our educational actions and instruments would be if it were required that all assessment must first benefit the learner, with the student learning "in vivo," and not simply demonstrating the knowledge test-makers have decided they should know.

The **educative** portfolio supports student learning throughout the portfolio-building process, with resulting portfolio artifacts (curated student work, student reflections, interviews, and other media) providing more useful and abundant evidence of achievement than a simple metric. The portfolio provides a window into the processes of the student's learning and offers appropriate contextual information for that learning. Let us contrast the analytic value gained through portfolios rather than placing standardized student test results under a microscope to be observed in static isolation from its context.

Portfolio artifacts lend themselves to better informing teaching and learning as they provide the contextual information, longitudinal examples, and in-depth reflective essays offering richer and deeper analysis of the student's learning. We reiterate the imperative that educational assessment should serve student learning, as we re-examine the educative value of portfolios. We reference Principle 3 of this series, " Assessment design supports learners' processes, such as motivation, attention, engagement, effort, and metacognition."

The Educative Portfolio Approach to Teaching, Learning, and their Assessment

The portfolio is an intentional collection of student products/artifacts that represent their learning. Artifacts may be the results of teacher-initiated learning, group projects, and projects learners pursue independently. From inception, the primary focus of the educative portfolio is to benefit student learning. This liberating, mediating learning tool is guided by a framework of education values, habits of mind, and processes unique to their context. These portfolio contents and goals are defined via teacher collaboration and intentionally designed to encourage active learning via exploration and experimentation. Teachers act as mentors and guides, providing challenges and direction, but the portfolio product truly belongs to the student. Student input is welcomed, encouraging engagement and investment in the portfolio process.

The educative portfolio is dynamic and open-ended without the need for a unitary model of excellence. Students are encouraged to experience the wonder of learning, following their curiosity and navigating their chosen paths of exploration and learning. How does one "measure" wonder, the experience of gazing upon a Picasso painting or the moving images created by a kaleidoscope? The educative portfolio culture focuses on students asking questions and discovering their answers rather than simply answering other people's questions. Their analysis provides rich material to support the diagnosis of learning and teaching deficits and remediation recommendations. Portfolio artifacts will also remain available for continuing meaning-making, examination, reflexion, and pedagogical analysis. While educative portfolio reviews may evaluate an individual learner's strengths, weaknesses, and progress, large-scale efforts to use comparative scoring across student populations has not proved valid, reliable, or useful.

Shouldn't young people experience a period of exploration, choice, and opportunities to freely express themselves? How can we teach the values of liberty when our education system measures a student's worth primarily by their ability to answer other people's questions—while teachers' jobs sometimes depend on their students' test scores? The educative portfolio experience is a learning process that extends beyond the limitations of space and form, reshaping what we can imagine education to be. In this process, the heuristic role of teachers enables students to "find out for themselves" within an environment of nurturance, support, and mutual respect, fostering a true teacher–student partnership.

Our Exemplars

While there have been many projects and studies of portfolios designed and used for the purpose of assessment, a paucity of portfolios created to enable and nurture student learning required us to pick extant models closest to our vision for the educative portfolio. Examples include two Middle School Studies (the Portfolio Assessment Collaboratives in Education [PACE] study and the Hernandez Bilingual School Portfolio Study). The third exemplar is the Ramapo College Teacher

Education Portfolio for undergraduate teacher education students. Though these projects were conceived for assessment, we found the richness of student portfolio work impressive and offered many opportunities to better understand student learning above and beyond questions we would even think to ask. When analyzed, these portfolios delivered an authentic, in-depth picture of what, why, and how students were learning and a richly nuanced picture of each student's learning process.

We integrate exemplar portfolio artifacts into this chapter to bring student voices into the discussion and extract the causative learning elements that supported their learning. Our first portfolio exemplar excerpts come from the Hernandez Bilingual School (HBS) during its first year of portfolio education. The Hernandez Portfolio Table of Contents/Checklist helps students organize the required artifacts in the portfolio and ensures that each is present. This bilingual portfolio project requires artifacts in both the student's first and second languages.

Hernandez Portfolio Content Checklist and Assessment Guide

Tables 1 and 2 help illustrate what a full portfolio looks like. The Hernandez Portfolio Content Checklist (Table 1) specifies what each portfolio should contain: an introductory letter explaining the purpose of the portfolio, the number of assignments across a range of disciplines and genres, explicit performance standards for included artifacts, explicit criteria for the whole portfolio, and an explanation of included artifacts learning units. The following specific artifacts are required: illustrations of group work; a range of perspectives on the student's growth and achievement including self-reflection, peer, teacher, and parent reflections. Multiple drafts permit observation of students' learning processes, growth, context, and representation of home culture and language. Students must check off that each of these components is present to submit their portfolio (See Table 1).

Table 1.
Hernandez Portfolio Content Checklist

Content Checklist	L1	L2
Introductory letter (should include student's understanding of why she does portfolios)		
Explanation of project or assignment for each entry (attached to work)		
Multiple drafts of work		
Collaborative piece		
Varied perspectives on student growth and achievement 1. Students reflections (attached to work 2. Peer reflections 3. Teacher reflections and comments 4. Parent reflections		
Explicit performance standards (rubrics, benchmarks)		
Range of disciplines represented by work		
Range of genres		
Selection of work that permits observation of growth		
Representation of home culture		
Number of pieces of work in each language		
**L1 Refers to the student's dominant language, L2 to their second language.*		

The **Hernandez Narrative Portfolio Analysis Guide** (Table 2) is organized according to the nine guiding principles and related big ideas and processes based on "habits of mind," that the teachers hope to engender in their students. Teachers met weekly over several months to form a consensus in defining the guiding principles and ensuring they honored their ethnically diverse student population. One or two artifacts are required in each of the 9 categories. For the assessment guide, excerpts from the student's portfolio provide evidence of habits of mind, big ideas, and processes from each category and documented by the reviewer. Table 2 includes a completed narrative portfolio analysis (the sample does not show a quantitative assessment). Commentary is included where deemed important. The last 2 columns of the table are marked to indicate P-Presence of work, or Q-Quality of work (this experiment in quantifying portfolio analysis was found ineffective in adding useful information to the teacher guiding the learner.)

Table 2.

Hernandez Narrative Portfolio Analysis Guide

<table>
<tr><th colspan="2">Guiding Principles (Habits of Mind)</th><th>Big Ideas</th><th>Processes</th><th colspan="2">P/Q*</th></tr>
<tr><td>1</td><td>empathy/ perspective taking</td><td>similarity and difference, contexts, values and valuing</td><td>communication

transference</td><td></td><td></td></tr>
<tr><td colspan="6">Community service: I still feel bad for people who don't have places to stay or food to eat. The hardest thing was there are other families out there without Thanksgiving meals. I was just glad that Father Jack would be choosing which family would get the food.

Time Traveller: The book begins with the Time Traveller telling some men his ideas of time and space. The book isn't written from his point of view; it's written from the point of view of one of the men in the room.

Commentary: Writing: In her writing, Yara realistically represented the dialogue and point of view of each of her characters in context in a sophisticated and complex manner</td></tr>
<tr><td>2</td><td>reflection</td><td>any/all the big ideas</td><td>conceptualization, analysis, synthesis, evaluation</td><td></td><td></td></tr>
<tr><td colspan="6">Science reflection: I learned how to make an effective water filter. I don't know why it's important for me to know this. Maybe we'll have a Dirty water Emergency in the future. Then this information will come in handy.</td></tr>
<tr><td>3</td><td>service/ responsibility</td><td>values and valuing, contexts, interaction and constraints</td><td>Decision-making

self-regulation</td><td></td><td></td></tr>
<tr><td colspan="6">Community service: What affected me most was that I was actually helping out. It wasn't a little thing, like picking up a gum wrapper off the curb. The few cans of corn I put in the box actually helped a family have a better Thanksgiving.</td></tr>
</table>

Table 2. (continued)

Guiding Principles (Habits of Mind)		Big Ideas	Processes	P/Q*	
4	**imagination/ creativity**	**reflection, perspective, experimentation.**	**conceptualization**		
Writing Assignment: The Wise Boy: Long ago, in a Mayan city in Guatemala, now called Palenque, there lived a young boy. This boy was only 13 years old, but he was as wise as the wisest old man in the town. Every day, people came to him with questions and every day, he answered all of them. *Commentary This principle is one of Yara's outstanding characteristics in all her writing and other work.*					
5	**curiosity and inquiry**	**cause and effect**	**information processing** **hypothesis generation and testing, collecting evidence**		
Manta Ray report: My driving question was "What is a manta ray? I wanted to find out everything I could about mantas Water Filter: My hypothesis was that pouring water through layers of rocks, dirt and gravel would clean it because water gets filtered when it goes through the earth.					
6	**skepticism/ respect for knowledge/ wisdom**	**cause and effect** **interaction, constraints**	**critical thinking**		
The Wise Boy: "Boy, you can't always be right," said the old man. "You are wise beyond your years [but] you are not the smartest person who ever lived. Remember this, if you try to please everyone, you will probably end up pleasing no one."					
7	**cooperation/ collaboration**				
Math: The activity wasn't hard. What was hard was trying to get my group to work. We started out O.K., but never finished our work Social Studies: we pretended to have a meeting where people were trying to decide whether or not to make the Boston harbor Islands a national park.					

Table 2. (continued)

<table>
<tr><th colspan="2">Guiding Principles (Habits of Mind)</th><th>Big Ideas</th><th>Processes</th><th colspan="2">P/Q*</th></tr>
<tr><td>8</td><td>appreciation of diversity</td><td>Similarity, differences contexts, systems

interaction, constraints</td><td>communication

evaluation</td><td></td><td></td></tr>
<tr><td colspan="6">Boston Harbor islands meeting: The power was exercised positively. But Mr. NEve kept trying to take the power and use it negatively. Ultimately, no one person had all the power. That's how it is when you vote.</td></tr>
<tr><td>9</td><td>environmental awareness</td><td>Systems, cause and effect, continuity and change</td><td>quantification

conceptualization</td><td></td><td></td></tr>
<tr><td colspan="6">Boston Harbor islands meeting: I would have voted to make them a national park so that there would be people to make sure they were clean, there would be more jobs, and the wildlife there would be better protected. See "Curiosity and inquiry"-water filter</td></tr>
</table>

All excerpts in Table 2 are the student's actual words from a piece of work or reflection on work. The analysis notes her outstanding imagination and creativity in her written work. We can see her ease with scientific concepts such as "guiding questions" and hypotheses. Note the frustration in group work where the members do not live up to their responsibilities. Her empathy is represented by her response to a service activity in a soup kitchen. She notes that in a group decision made by vote, not all power is held in one person's hand. Each entry by itself may not convey much information, but together they create a powerful set of patterns and a picture of this student's concerns, processes, values and skills.

Portfolio Culture

Portfolio learning flourishes in a well-supported environment and helps create and sustain that culture of learning. In a healthy portfolio culture, students are seen as active, important, and valued agents, not as passive receivers of information. Dialog-centered instruction alternates with small-group work, and student collaboration in non-teacher-directed projects is encouraged. The portfolio culture is characterized by a common spirit of cooperation, openness, support, reciprocal concern, self-criticism, and revisions. Full-scale portfolio learning encompasses project work, performance tasks, writing processes, and reflections. The educative portfolio culture is intended to nurture student intellective achievement, encourage intellectual engagement, and expand opportunities for holistic learning. Teachers conference with individual students to personalize support and offer specific suggestions to best support that student's growth. The teacher is a facilitator and mediator who guides students in their learning process in an atmosphere of mutual respect.

Activities occurring around the portfolio process are also part of the "portfolio culture." These include portfolio interviews, exhibitions, and events where students present their work to their parents and teachers as a focal point of their parent/teacher/student conferences. HBS has an expedition each semester that takes students out of the classroom for more experiential learning and engages much of the community. Illustrating the value of educative portfolio culture, we observed high levels of engagement, we saw students so engrossed in writing activities that they eagerly skipped recess to work on revisions. We found students seeking resources in local libraries for projects and seeking out subject matter experts on their chosen topics of inquiry.

In the educative portfolio culture, teachers work alongside their students as caring coaches, helping chart a personal path for each student and celebrating the learner's growth as the portfolio grows with commemorative artifacts. The portfolio gives students ownership of the process. Evidence of a student's learning are not dependent on abstract rating metrics, they are tangible achievement products they can hold in their hands. Educators and students identify many outcomes enabled by a portfolio culture including efficacy and agency, pride and ownership, organizational skills, developing achievable goals, and self-reflection.

The following interview illustrates some of these aspects of portfolio culture. The interview occurred during the authors' participation in Portfolio Assessment

Collaboratives in Education (PACE) portfolio development project. Evers is an African American 6th grade student with a history of non-engagement in school. His parents are supportive and highly educated, and his two older brothers are considered "superstars." Evers' parents believe he may have a slight learning disability, but they have not consented to having him tested. Evers is extremely proud of his work this year and though he has completed his projects and shown progress in his learning, he has not reached the standard for his grade. Though Evers typically mumbles, he enjoyed learning speeches from Macbeth and holds a sophisticated understanding of the main ideas of the play. Below are excerpts from his portfolio interview where he discusses his essay on Macbeth.

Interviewer: Has anything been hard for you in creating this portfolio presentation?

Evers: Yes, the work. All the work. This is very tough work. It's hard to write this kind of work and still enjoy something. Cause when you get work like ____ and ____, it's very difficult, it's very interesting, and it has a lot of meaning.

Interviewer: Do you think that the meaning is something you can apply in your everyday life, did you learn something about life?

Evers: I learned that um' like don't be fool and don't try robbing and murder cause it's gonna backfire.

Evers also published an imaginative story about a boy named Tom, who loves elephants. While Tom is riding on an elephant with his friend, he hears the elephants telling each other jokes. Tom is so shocked that he falls off, but his elephant saves him from being crushed. The following passages express many of Evers' fears and frustrations including difficulties with school, doubts about his intelligence, and the value he puts on interpersonal relationships:

That's how their friendship began. They played and had lots of fun together. They did not realize what month it was. Thomas rode with the elephants and could have anything he wanted. He learned to have the power of an elephant and the wisdom, too. Then Thomas noticed that it was almost time for school to start again. The night before the first day of school he ran away and went to live with the elephants forever. After a while the boy was getting smarter and smarter.

Speaking with him, we learn he holds low expectations for himself and possibly this contributes to his diminished efforts at school. Completing and publishing his storybook shows his capacity to produce thoughtful, creative work that holds meaning for him. His story also reveals some of his perceived difficulties and attempts at solutions. His mother was extremely positive about the work he was bringing home and is pleased that he's now doing his work!

You don't know…we used to have to find him in the house to get him to go to school. Look for him wherever he was hiding. It's the first time he's been included in the social interaction and the academic interaction of the school. They used to kind of sit him in a corner and he developed a very hostile exterior so that no one would bother him…Evers' mother.

Both parents credit the school's culture for turning around their son's history of non-engagement with schoolwork. Portfolio cultures honor the knowledge that learning is a process and not a static achievement, and the culture demonstrates the arc of learning by accepting and supporting students at any point along the trajectory.

Images and Metaphors for the Educative Portfolio

Images and metaphors communicate beyond the strictly literary. Malia, an African American 6th grade student, stated in a reflection, "My portfolio box is like a rose. It's like all my work is the thorns, and I'm the flower reaching to the top to be the best I can be."

Like a mirror, the educative portfolio reflects each person's unique qualities, including their learning processes. The learner can more easily engage in self-reflection and reflexivity with this travelogue of tangible evidence showing where their learning began, where it is now, and where they are going. As a dynamic guide, the portfolio celebrates the student's memorialized learning achievements and milestones. Students may even view their portfolio as a reference library of their identity. Viewing the multiple dynamic components of the learning process, we can see the educative portfolio as a kaleidoscope, with each rotation realigning the components into different relationships. Using the kaleidoscope metaphor, we imagine portfolio artifacts as elements that may be reordered, repatterned, and juxtaposed with each turn. Using the collection of each students unique artifacts, educators can analyze, diagnose, and support the learner's development in one connected recurring cycle.

Fulfilling the Promise of Educative Portfolios

How the Educative Portfolio Supports Learning Activities

Human Activity: Learning from Experience, Prior Knowledge, and Its Representations

When we problematize a situation, we learn while working towards and discovering solutions. That humans learn from activity is the foundation of much educational design. Portfolios provide a container for activity as a labor-a-tory for active learning. Human activity and problem-solving are learning processes. The ancient Bhagavad Gita teaches that the nature of the human mind is constant activity, that what defines us as living beings is activity, and to be human is to be active, and to be active is to be learning. Vygotsky (1962), among many others, believed in the educative power of social activity as a foundation of learning theory. Active learning through social interaction includes mediation provided by teachers, by more advanced peers, or can be provided in the portfolio structure itself. Active learning through social interaction includes mediation provided by teachers, by more advanced peers, or can be provided in the portfolio structure itself. The capacity to learn from active experience is based on the progression from experience to symbol, then to developed ability. The integration of prior knowledge and its representations helps build the learner's cognitive structures.

Piaget, a strong proponent of the idea that we learn by doing, posits that a child's interaction with phenomena is a primary motor of development, putting activity at the center of learning and knowledge development, before perception and language (Ginsburg & Opper, 1988). To understand the functional and relational processes of human activity in this context, with development as intent, we must document that activity. Memorializations are the process of documentation for an educative portfolio, providing opportunities for the learner to transform physical interactions with phenomena into cognitive structures. Once memorialized in portfolio artifacts the experience is transformed into symbolic representation. We might look at a 7th grader's portfolio as a memorialization of the learning and accomplishments in that phase of the student's life. Activity theory suggests that encounters with activity result in learning, while reflexive review via memorialization further strengthens it. Educative portfolios provide students with opportunities to transform physical interactions with phenomena into cognitive structures and memorialized in their portfolio artifacts, transforming their experience into symbolic representation.

Documentation and Memorialization

Representations of learning can be for the purpose of "learning from." The educative portfolio documentation is intended to enhance student learning through the process of active creation. Documentation involves the symbolic representation of ideas, thoughts, and actions. This is a learning process, and the resulting documents/artifacts provide the necessary raw data for assessment and analytics.

Portfolio artifacts provide a record of what has been learned, including the circumstances and learning conditions by which the learning was enabled. Through dialogic pedagogy, nurturing curiosity, and "the asking of good questions," a student's educative portfolio memorializes dialectical, interactional, and relational processes. The intention of the educative portfolio documentation/memorialization is to enhance learning for the student. Documentation involves symbolic representation of ideas, thoughts, and actions. The products of these memorializing and processual activities provide a wealth of material for pedagogical analysis of learning, teaching, and assessment. Patterns of consistency and the systematicity of these associations provide a better understanding of the learning mechanisms and their meanings for the learner and this understanding better informs and improves learning, with summary judgments focused on progression. Another benefit is helping students understand their own metacognitive functioning and more effectively self-manage their learning processes. This aligns closely with Principle #4 of this series with student autonomy promoted in the educative portfolio allowing the learner to pursue learning based on their interests and encourages student engagement and ownership of their learning.

Most learning situations require the learner to access multiple data points simultaneously and concurrently to enable sense-making. Facilitation of learning and using prior knowledge to continue that learning process require a constant flow of abstract conceptualizations as the learner moves from one sense-making challenge to the next. Think of learning as a series of sense-making challenges with mental tasks in a continuous flow of automatic relationship discernment across numerous and changing connectives, many of them represented by abstract symbols. Student reflexivity is engaged when reflection is intended to result in action. The educative portfolio thus serves as the vehicle and container, with memorialized student work and student reflections on their work generating reflexive processes that support growth in learning and analysis. Reflexivity is engaged when student reflection is intended to result in action. Engagement in the activity is of primary learning value, with memorialization reflexivity as the second most powerful determinant. Activity is internalized and transformed into mental structures, begetting symbolic representation.

Learning and Symbolization

Symbolic representation and its documentation in educative portfolio development gird the utilities of the portfolio as a learning tool. In animal life, the brain or the neural system is programmed by the activity of motivation and sensory phenomenon, animals learn stimulation forcing their limbic and sensory systems to act. To accommodate its environment, an organism's neural cells are organized so that learning is the programming of these neural cells. For human beings learning to be symbol users, symbols begin as tools, as instruments for doing things. Evolving into images and visual representations, symbols facilitate memory and further organize brain cells to achieve specific purposes. Thus, the symbolic memorialization features of the educative portfolio facilitate the learning process.

Most portfolio content is written language, making the discussion of symbolization especially important. This symbolic documentation provides raw data for further "learning from." Vygotsky (1987) suggested that oral language is a first-order symbolization of thinking and that writing and reading are second-order symbols or abstractions. The translation of thoughts first to oral language and then into written language is a complex cognitive task and writing creates a new awareness about the nature and powers of language. Mario Vargas Llosa (1991) here suggests the power of written language to initiate new learning:

Important knowledge about reality always comes out of [writing] … through a … transformation of reality by imagination and the use of words … When you succeed in creating something different out of … experience, you also achieve the possibility of communicating something that was not evident before … But you cannot plan this transmission of knowledge (Vargas Llosa, n.d., p. 79).

Bruner (1966) also placed great importance on the internalization of language as a cognitive activity, positing that written speech may bear the same relation to spoken speech as algebra bears to arithmetic. He sees language as an impetus or an engine to thought; when we are engaged with words, we are "led forward by them," and language itself affects the way we use our minds (a reflexive relationship) (1966), p.104). The centrality of writing as the mode of documentation in portfolios reinforces the process of writing as representing and leading thought. The following exemplar demonstrates this capacity; that translation of concrete phenomenon into symbolic representation is useful as it permits manipulation serving the process of learning.

In a portfolio interview with a student who recently arrived from Vietnam, we discussed an entry he had written in English. As he tried to verbally reflect and interpret the meaning and context of his work, his thoughts went beyond his capacity to express them in English, creating noticeable frustration on his part. To alleviate his obstacle, the interviewer asked him to relate his thoughts in Vietnamese. The student spoke easily, seemingly expansive and articulate. The interviewer nodded enthusiastically while the student continued in Vietnamese. She then asked him to reprise this same discussion in English, and he did so eloquently and with little hesitation. The student spoke with pride about his portfolio; he appreciated the ability to share it with others and provide evidence of his developing mastery of English. As the interview concluded, the student exclaimed, “I had no idea that you spoke Vietnamese!” The interviewer responded, “I don’t,” much to the student’s surprise!

In the process of language learning, or any learning, we are often unable to manipulate more than one high-level cognitive activity at a time; the capacity to think in one symbol system and speak synchronically in another was not yet available to him. Expressing his thoughts in his primary language first allowed him to manipulate the translation from one system of symbolization to another as a separate function. Whether thinking is represented in language as written in a portfolio or as a reflection in a spoken symbol system, the capacity of the mind to simplify cognitive processes through the manipulation of symbols facilitates higher-level learning.

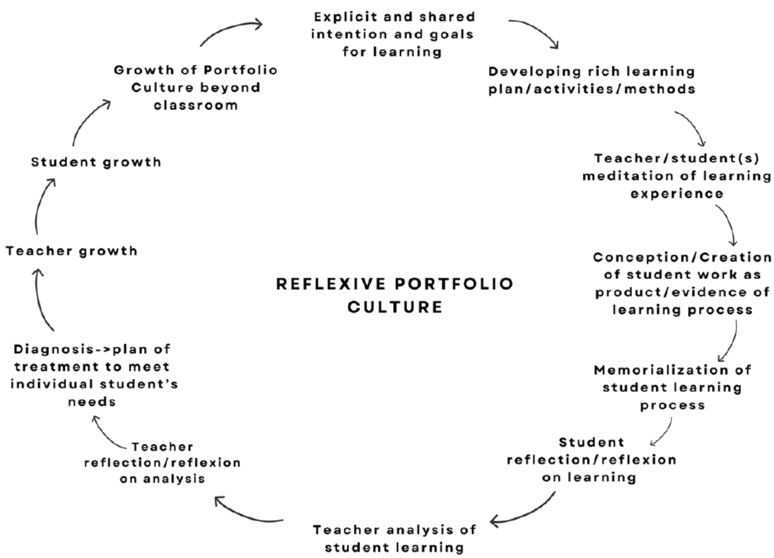
Analyses and judgments of the learning represented in portfolios are often based upon written content and drawn from writing’s function as a reflection of cognitive processes. In the educative portfolio milieu, student writing assessment shifts from their degree of developed ability to a deeper analysis of what the writing teaches us about the students in ways that can enhance our ability to support and guide her growth. The focus is on what the writing indicates, requiring a more active analytical stance on the part of the teacher.

More About Reflectivity and Reflexivity: Learning from Documented Experience

Portfolios support and nurture a culture of reflective/reflexive teaching and learning, with memorialization artifacts representing learning for the purpose of "learning from." Earlier, we discussed the portfolio as a mirror, a reflection that allows observation of one's own processes and products. Reflection may be celebratory or commemorative, both worthy concepts. Reflexivity moves beyond reflectivity and implies intention in the review of one's own biases and reactions to their assessment and analysis of work. These insights can lead to more skillful actions and greater discernment in thinking. For example, if we reflect on an interaction with another person, our purpose may be to re-experience pleasure or to ensure we remember the details. If we review this interaction to critique or to deepen our understanding of our own perspective, this moves into the sphere of reflexion. When our review is intended to inform our future actions, such as whether to offer an apology or request more communication, this is now a fully reflexive process.

Reflexivity is a cyclical sequence (See Figure 1) in a continual process of internal investigation with the intent of improvement. Applying our kaleidoscope metaphor, we see that each turn of the lens provides a new picture of the same components. Every new piece of learning, like the flapping of a butterfly wing resounding across the universe, is rearranging and expanding our understanding and informing our actions. We see in the diagram below how reflexivity guides portfolio culture and brings depth to understanding our own and others' assumptions, perspectives a

Figure 1.
Reflexive Portfolio Culture Dynamics



What better use of the portfolio's potential than the pursuit of critical understanding, learning synthesis, analysis, and disconfirmation of assumptions—all aspect of reflexive thinking? Interpretation, imagination and reflexivity may be seen as mentation in its highest expression, and all three can be served by the documentation and memorization functions of the portfolio.

Reflection is intimately connected with how language structures our understanding of our experience and places it within a cognitive framework. Active involvement in reflective assessment encourages students' cognitive and metacognitive awareness of their learning process, providing a sense of control over the learning process, and encouraging self-determination in learning. Cognitive and metacognitive awareness of our learning process internalizes our locus of control and self-determination, shown to have positive effects on student achievement

(Pressley & Ghatala, 1990). In conventional disciplines of knowledge, we know concepts and theories serve to illuminate and connect observed facts. Portfolio reflections helps unify the learner's scatter of knowledge and refine how that knowledge relates to them as an individual.

Reflection is a critical part of teacher and student behavior in portfolio culture and fundamental to helping students develop work of higher quality, by reflecting on one's own work in relation to an external or internal set of criteria. Good teachers model such reflection in the substance of their own teaching. Through reflexive activity, the mechanics of analysis and appraisal become tools of teaching and learning. Reflective thinking becomes a practiced central part of student activity when students are expected to complete and save multiple drafts of works and incorporate their reflections into the final product. Additional reflection opportunities may include portfolio presentation days, exhibits in the classroom or for the community, or archives containing student work demonstrating fulfillment of portfolio criteria.

An exemplar: The Ramapo College Teacher Education Portfolio project focuses on self-reflection to support student development, and the portfolio is a requirement for teacher education graduation and teacher certification at the College. Self-reflection is intended to instill reflective and reflexive habits of mind in preparation for successful student teaching and candidates are encouraged to continue this practice. Most impressive about this portfolio process is the insight students gain about themselves as they collect, select, systematically review, and reflect upon their best work throughout the entire four-year program. This insight is illustrated in the following student reflection:

My portfolio helped me to see that my classes have helped me to be prepared in some ways. My portfolio showed me the different areas of teaching and why they are important to us as teachers. The assignments I have added to my portfolio, I feel really fulfill the requirement. I also like the fact the portfolio helps to show us our weaknesses and strengths when it comes to teaching. The reflections I have written throughout this portfolio have helped me realize what I need to work on as a teacher. I do have a few weaknesses that I feel need to be addressed before I student teach next spring, and I will work very hard to work in those areas and improve them. —Dave

In their portfolio interviews, Ramapo College students have remarked, “I didn’t realize I did so much work,” or “I am surprised that the work I did really makes me feel prepared to begin my student teaching,” as they build their portfolios. Most satisfying as an educator was hearing, “I see now how all the classes fit together.” Fine-tuning their self-perception as they move from college student to future teacher, their portfolios provide more accurate evidence-based perceptions. Those who began the program with trepidation gain confidence through their documented accomplishments and abilities and conversely may temper overly positive misconceptions about one’s level of teacher competence.

Relational and Contextual Holistic Learning

An important argument in favor of educative portfolios is the integration of the cognitive, affective, and conative ways of knowing. Learners exist within a variety of global, community, classroom, and family ecosystems, that differ for each learner. As Moll (1990) argues, cultural context may imbue the learner with strengths that they may build upon. Educative portfolios are holistic and integrative, uniting various aspects of a learner’s education experiences. The educative portfolio may illuminate the cultural context of the learner’s life, as well as important cultural-historical contexts.

An exemplar of the portfolio’s relational and contextual value may be seen in this predominantly Navajo School District in Chinle, Arizona, where sixteen 5th grade teachers participated in developing a portfolio assessment. Aligned with the Navajo-based curriculum and Arizona’s curriculum frameworks, the project was intended to address the cultural context of Navajo students using criteria and rubrics reflective of their cultural values. For example, their Life Skills standards are interpreted in terms of Navajo philosophy, with well-being portrayed as the integration of mind, body, and spirit. Identified capacities were complex, such as cultural knowledge and self-direction, rather than simplistic facts and skills. The deforestation project the teachers designed asked students to work together and investigate a particular aspect of deforestation in their local area, one in which they would become an “expert.”

Students gathered information from multiple sources, analyzed the problem, and proposed a solution for a final presentation (Farr & Trumbull, 1997). This holistic, integrated learning paired important, real-life cultural and economic issues with high-level intellective process as students were challenged to view the harm of deforestation as it related to their own community. In their final presentation, students were directed to present their analysis of what steps could ameliorate harm to the environment and the people affected. Task structure encouraged students to use their knowledge to problem-solve in an authentic way. This included collaboration with peers, integrating various concerns and perspectives in their final recommendations, and sharing their findings with the community. Exemplifying holistic and contextual education, the deforestation project required students to have a relational and global understanding of the balance of nature as well as considerations of sustainability.

Requisites to Designing and Operationalizing Effective Educative Portfolios

Portfolio Curriculum and Pedagogy

> *"All curriculum plans are tentative, and children modify them by their response. Like the universe, curriculum is always expanding,"*
> —Jones, E. (1987).

Like the universe, educative portfolios expand the concept of curriculum far beyond "traipsing over trivia," and other content mastery tasks characterizing many curricula. Emergent Curriculum, as discussed in Jones' (1987) work, puts curriculum into the hands of the learner by integrating their interests, their questions, and their community knowledge. Traditionally, curriculum references a curated collection of knowledge and skills. This academic canon, divided by disciplines, and building through the grades, is intended to turn out "educated" children. That standardization of curricula is in part due to required symmetry between what students are taught and the secret content of high stakes, external assessments. In contrast, the educative portfolio is an instrument that supports education as the construction of one's own knowledge and meaning. Educative portfolios enable a curriculum attentive to developing an individual's mental capacities and heartful intelligence. Learning to develop effective strategies to think and solve problems should hold the primary position, with curriculum content serving as a beneficial tool.

An impressive example of an inquiry-based middle school curriculum with complex interdisciplinary projects comes from Saturno and Wolf (1997). This integrated archeology and mathematics project is also a prime example of "problematizing" learning. Saturno and Wolf identified "four core skills… at the heart of archeology: "1) genuine curiosity, 2) careful inquiry, 3) thoughtful inference, and 4) humility" (p.5). Students were directed to take the viewpoint of archeologists discovering hieroglyphs of the Mayan numerical system and try to decode their meaning. This activity was an "entryway" to study of the Mayan culture, arts, myths, and the scientific and mathematical knowledge of these ancient peoples.

This level of complex curricula is a requisite to supporting an effective and strong portfolio, providing ample opportunity for student self-reflection and useful analysis of learning. One student was so inspired by the task that they extended their inquiry into additional learnings about the Roman and other ancient numerical systems. The portfolio curriculum's flexible and open-ended format supported this student's research even further, as they began to study the Arabic numerical system and how it developed the sophisticated and original invaluable contribution of the zero placeholder. Our goal is to have educative portfolios embedded in this type of rich curriculum, supported by engaging pedagogies prioritizing holistic student development. We propose that developing students' abilities to apply their knowledge in solving novel problems will better prepare them for success in a constantly changing world.

Complex, authentic tasks are necessary to develop capacity and depth of reflection. Wiggins and McTighe (2005) defined a set of design prompts using six elements in creating such portfolio-worthy pedagogical "gems." Complex units of learning support an effective and strong portfolio while providing ample opportunities for self-reflection and useful analysis of learning. Educative portfolios enable a curriculum more attentive to student engagement and the development of genuine mental and heartful abilities. We reiterate that assessment should be a tool in the development of students' mental abilities rather than the primary driver of education. Educative portfolios and a curriculum prioritizing students' mental and heartful development offer a solution.

Curriculum Principles of Caring

Another proposed requisite is placing the evaluation of student learning into the hands of their teachers. Teachers are the experts on the contexts and needs of their students, families, and communities. When teachers are empowered to determine the specific values and goals to guide their curriculum and teaching practice they can provide symmetry between what is taught and what is assessed. Hernandez Bilingual School teachers met regularly over a few months to hammer out a consensus on the principles that would guide their portfolios. Together, they created an assessment guide respectful of the students' first language, knowledge, and skills alongside their acquired English language knowledge and skills. By creating portfolio frameworks locally, teachers were able to chart their path and build a cohesive portfolio program and culture.

Passionate, Caring, Reflective Teaching Persons and Pedagogy

Educative portfolio programs require greater teacher effort and time than needed for standardized test preparation and externally scored multiple-choice tests. In truth, this is often a stumbling block to establishing portfolio cultures more broadly. We must remain cognizant that without a conscientious commitment from schools and districts to provide the time and resources necessary for teachers to succeed, educative portfolios may burden already overburdened teachers. However, dedicated teachers such as those at Hernandez continue to strive and develop these tools to attain their desired teaching and student outcomes. Hernandez teachers feel it is worth their time and effort to create an experience providing their students with lasting positive life-changing impacts. Portfolio curriculum and pedagogy are designed to place responsibility on students to make decisions about their learning. The heuristic nature of the portfolio values questioning and allows students to follow their own compass through organic pathways of authentic learning. Guiding principles and frameworks place no boundaries around learning content or mode of representation. Instead, they support "the having of wonderful new ideas" (Duckworth, 2006), without squelching passion and independence in the learner. In a portfolio culture, pedagogy is mediative, and the curriculum is adaptive to the learner.

Customization and Personalization of Learning

The educative portfolio's adaptive structure meets the needs of both individual learners and the general developmental needs of the group. With teachers in a more heuristic role, tasks, and activities can be self-initiated, with students owning their learning. Each portfolio becomes a stable trove of information about that student's learning, illustrating their strengths, indicating where they need support, and providing the depth of information needed to inform analysis, diagnosis, and remediation.

In discussing teachers of excellence, Ladson-Billings sees teachers in the role of coaches, sharing learning responsibility with students. This shared responsibility for learning between teachers and student is an ideal model for the educative portfolio. Each student has a coach to ensure they meet their own expectations as well as external learning goals. Ladson-Billings also discusses "non-unitary" criteria for excellence, acknowledging that excellence has multiple valid forms. The educative portfolio orients towards student learning and encourages relational, dialogic pedagogy. Portfolio dialog is organically generated, with teachers, peers, parents, family, and community members external to the school brought into the conversation.

The educative portfolio challenges our enculturated conflation of learning with assessment. Minimizing the focus on standardization for comparison and prioritizing service to the student's learning experiences invites the paradigm shift discussed in this chapter. An extant model of personalization of learning is seen earlier in our nation's history, in one-room schoolhouses where personalization was a necessity. Julia Weber Gordon (1946) relates her teaching experience in such a school. Her book, The Country School Diary, illustrates a learning community where each student's curriculum addresses their personal and unique needs, passions, and context. Vibrant and detailed models like hers demand that we look backward as well as forward for inspiration.

Structuring a Memorialization of Students' Work

Some of the most brilliant scholarly work has been achieved when amorphous, rich, lived knowledge is systematized and structured, gathered into meaningful groupings that clarify and facilitate the transmission of meaning. Though the structure is adaptive, the educative portfolio still requires a framework to structure the contents and uncover patterns of meaning. A Ramapo teacher education student reflects, "I also like the fact the portfolio helps to show us our weaknesses and strengths when it comes to teaching. The reflections I have written throughout this portfolio have helped me realize what I need to work on as a teacher." A well-structured portfolio framework brings patterns concretely to the fore allowing the student to analyze his/her own achievement.

The student reflection sheet below for "Habits of Mind: Problem Solving" is an example of a mediative heuristic guided portfolio reflection in middle school. Students were directed to select work illustrating their problem-solving ability. Lucia chose to reflect on a paper she had done on the 6th grade overnight field trip that included a problem with bugs.

1. Briefly explain the problem you were trying to solve.
   The bugs at the overnight field trip.

2. Explain how you went about solving the problem. What did you think about first? What steps did you take?
   I just wanted to go home. I just covered my face and I moved and tried to go where there wasn't no bugs.

3. Explain what you think is special about this assignment. Why does it stand out as a good example of problem-solving?
   Because then the bugs stopped coming to me, although they came back.

4. What was your biggest challenge in solving this problem and how did you deal with it?
   Them bugs up in my face, I couldn't deal with it. But then to solve the problem I stopped complaining,

5. What piece of advice would you give so someone who was working on a similar problem?
   Bring something that would keep the bugs away from you.—Lucia

Lucia shows wisdom beyond her years expressing that we can help solve a problem by letting go of complaining! Though Lucia's effort is incipient, the structured reflective and reflexive questioning helps her see, and perhaps better understand her thought processes framed in a unique, coherent structure.

Analysis Appraisal, Evaluation, Judgment, and Interpretation: Byproducts of the Portfolio

Educative portfolio creation encompasses an inventory of cognitive activities that facilitate learning including attention, engagement, discrimination, selection, choice, and comparison. The documented artifacts offer bountiful data for learners, teachers, and others to analyze, appraise, judge, and interpret for understanding, valuing, and supporting the learning of the student. We enhance student learning by creating tasks and student learning is further enhanced by their memorialization. We believe their analysis is best integrated into a reflexive cycle of learning growth when the teachers, who know their students best are the ones designing the tasks. The educative portfolio is a powerful tool for learning with analysis of that learning providing higher fidelity, in-depth, and more useful data to better support and direct that learning.

Scaffolding the Process of Analysis

How do we approach the analysis of student learning from portfolio artifacts? The qualitative assessment of portfolios at Hernandez demonstrates a reflective and reflexive approach. These four heuristic tools (Tables 1, 2, 3, and 4) are part of one whole integrated analysis process, the goal of which was to be systematic, equitable, and experiment with quantification. Their heuristic Narrative Portfolio Analysis Guide (Table 2) uses as criteria the 9 guiding principles and asks the reviewer to assess both the presence of the criteria and the quality of the criteria. Table 3, Qualitative Portfolio Review Guiding Questions, asks probing questions concerning the individual student's achievement and portfolio structure itself. It is a reflective/reflexive tool to probe the validity of claims in terms of sufficiency of evidence. The questions address the student's work, the student's understanding of their own learning, and the capacity of the portfolio to answer those questions.

Table 3.

Qualitative Portfolio Review Guiding Questions
A. Evidence of Growth Do the contents of the portfolio sufficiently allow for a meaningful analysis of the student's growth and achievement, multiple perspectives and non-unitary standards? If yes, explain and illustrate.
Commentary and evidence:
B. Evidence of Achievement
Depth Criteria: Does student work demonstrate understanding through application of concepts? Does student work demonstrate conceptual richness? Does student work demonstrate complex thinking? If yes, provide sample evidence.
Commentary and evidence
Breadth Criteria: Does student work demonstrate a breadth of conceptual understanding and skill? Does she/he make connections between various disciplines to solve problems? Is disciplinary knowledge presented in an integrated fashion? Describe. Does the student demonstrate ability to take multiple perspectives?
Commentary and evidence:

Table 3. (continued)

C. Multiple Perspectives: Are multiple readers and their perspectives included in the portfolios (such as peers, teachers, parents, and family members, experts in the field). Do these various perspectives reflect some common judgments? Provide evidence.
D. Non-Unitary Standards How does the student's work compare to the definitions of excellence held by peers, teachers, family/community? How does the student's work compare to the definitions of excellence being developed by the student?
E. Student Self-Review:
Commentary:
Teacher Analysis and Plan of Instruction:

In Table 4 we address a qualitative aspect of the assessment focusing on academic growth as well as level of achievement when compared to grade level expectations and standards. The Hernandez Achievement Summary for an individual student's achievement, translates the narrative analysis (Table 2) to a set of numbers. The numbers you see in Table 4 are totals taken from the narrative analysis guide (Table 2). Table 4's cumulative growth assessment score and level of achievement score are calculated from the evidence gathered in Table 2 (scores were not included).

Table 4.

Hernandez Achievement Summary

Hernandez Achievement Summary	1	2	3	4	5
A. Growth in academic proficiency from the beginning of the year	|	2	|	|	|
Evidence: Yara started out very advanced, but it appears that major progress has not been made. As this is the first year of the portfolio program we do not have anything to compare across years.					
Strengths and things to work on: Yara uses the draft and revision process effectively. Changes that are more than mechanical often occur. Her level of skill in writing puts her at the top of her class. I feel she needs more advanced challenges to grow.					
B. Achievement (relative to absolute standards) overall	|	|	|	4	|
1. depth	|	|	|	4	|
2. breadth	|	|	3	|	|
Yara's growth achievement is 2 and her achievement overall is 4. This fraction, 2/4, represents the effectiveness of the school's program in supporting learning. Any number under 1 means that the student has not been challenged to their potential.					

How can such a tool be useful? In a summary analysis of Yara's Growth in Academic Proficiency, one reviewer notes that since Yara's artifacts show excellent advanced work from the start of the year it was difficult to see progress though her level of achievement was high across the whole year. This suggested that a higher-level scaffolding may be needed to provide the challenge and support necessary for her to fulfill her potential. This narrative evidence provides insight into individual needs of students and allows teachers to better meet their students' needs. Yara's need for higher level instruction and challenge could easily slip through the cracks if we relied on one static and unitary metric of her level of achievement relative to other students her age and grade.

In the final analysis, the first author believes that the quantitative element did not add information above that which was already apparent in the qualitative analysis of portfolio artifacts. And, all that adding and dividing took a lot of time that could be better spent focusing on the teaching and learning use of the portfolio. Moving forward with analysis and learning analytics seems the more promising route to pulling out evidence that will put learning first.

The Educative Portfolio Facilitates Program Review

The chapter's first author also participated in developing the Teacher Education Portfolio assessment for Ramapo College's pre-service teachers. They began with the contention that to develop competent learners and teachers they must evaluate not just students' acquired knowledge but also their processes and future ability to apply their knowledge in the teaching classroom. They developed the portfolio to assess pre-service teachers as well as accountability of the Teacher Education program. Their goals included that: (a) students become more reflective and reflexive practitioners; (b) students better understand the standards of teaching practice; and (c) students better understand their strengths and weaknesses. Portfolio completion is intended to help students integrate and internalize their pedagogical learning experiences and develop reflective and reflexive habits that enable modification of practices towards more effective teaching going forward.

Benchmark trainings helped faculty establish common acceptable interpretations of defined criteria using the New Jersey Professional Teaching Standards (NJPTS) as a base. Aggregating data across a selected range of students allowed evaluation of the program's strengths and weaknesses and suggested necessary program changes. Given the relatively low stakes for individual students and the small local program, we were able to mitigate difficulties found by larger entities (Koretz et al., 1993) in creating a valid and reliable portfolio learning and assessment system.

Conclusion: The Educative Portfolio as Instrumental to Human Learning.

More than 10 years ago, the Gordon Commission on the Future of Educational Assessment concluded that current academic assessment practices were deficient for students in this 21st century (Gordon Commission, 2013). The education scholars of the Gordon Seminar on Educational Assessment in the Service of Learning are currently exploring possible solutions. Though convincing arguments have been made that a technology designed to determine status cannot readily deliver effective learning interventions (Gordon Commission, 2013), we believe that by re-intentioning assessment portfolios towards educative portfolios, they can readily deliver the effective intervention solutions needed to enhance student learning. We see the educative learning portfolio as the best vehicle to assist learners in transforming non-static events (like activity and experience) into abstract theoretical constructs and symbols.

In this chapter, we reference the educative portfolio as a way of actualizing and refocusing our energies toward assessment that is in the service of learning. We need to develop greater capacities to engage in these broad analyses to better serve our learners. The kaleidoscopic metaphor reflects both shifting a paradigm using familiar components and our understanding of the dynamism of the learning process. We assert that the kaleidoscopic-like symbolic images of thinking processes can be better recognized once memorialized in portfolio artifacts. By creating new relationships with each turn of this kaleidoscope we can advance from assessing a learner's static state towards the dynamic, conceptual understanding available given the breadth and depth of data evidence provided through the educative portfolio.

A second concern is humanistic, in knowing the harm being done to our children by making standardized measurement the most powerful driver of our educational system. How can we best love our children/students? The institutions we created for schooling and assessment can provide a more fertile ground for learning if we prioritize a more relational, caring, personalized, and holistic education. Our current educational approach does not reflect what is known about the power of love and caring for successful learning, as well as the value and power of healthy human relationships. The "team" effort in completing a portfolio has teachers and students working shoulder to shoulder—as partners. The final portfolio interview or presentation is not an exam, it is an opportunity for the student to shine. Family and others may be invited for the presentation and a celebration may even be included. As human animals, we retain a strong drive to belong, to be loved, and to learn. When we put all of those together, we harness the power of these drives towards positive outcomes—so much wiser than working against them.

We continue to amass knowledge about what best enables learning, but how do we implement it? With technological advances allowing us to examine and analyze large amounts of qualitative data more effectively, portfolio pedagogy can now move forward with analytical support applied to this more holistic learning. Student portfolios are ready to mature into their more natural and comfortable role as powerful learning tools and support enhanced student learning and pedagogical analysis. With the many learning opportunities educative portfolios offer and the evidence they provide for interpretation and analysis, the educative portfolio clearly shows its value as a powerful instrument in the cultivation of human learning.

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