



Getting to Know Young Children: Alternative Assessments in Early Childhood Education

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Abstract

Assessments provide teachers with essential information regarding children's learning. Alternative education systems offer insight into ways that assessments can be redesigned to be developmentally appropriate to particular ages, including unique stances on what defines assessment, who should assess, and what should be assessed. We examined themes of early childhood assessment through a review of Reggio Emilia, Montessori, and Waldorf (also called Steiner). Each of these three alternative systems emphasize assessments designed to understand every child's learning as unique. Many of the practices used align with the National Association for the Education of Young Children's (NAEYC) current recommendations regarding developmentally appropriate assessment. There is a clear acknowledgement that engagement, not just specific knowledge, is particularly important to assess. To assess engagement, classrooms must be carefully constructed learning environments that implement individualized assessment techniques, such as observation. As children engage in developmentally appropriate experiences, teachers assess their individual learning patterns. Specific components of each system contribute to effective and informative assessment, for example collected artifacts and documentation from children's work (Reggio), activities and materials designed to show children when an error is made (Montessori), and participation in classic stories (Waldorf). The increased focus these systems place on assessing during interactive learning experiences answered NAEYC's current recommendations regarding assessment as well as on-going calls in education reform for a child-centered approach to learning.

Keywords Alternative assessment · Preschool · Reggio Emilia · Montessori · Waldorf

Introduction

More than ever before, assessments have become an avenue for measuring educational achievements in our schools (Basok et al., 2016; Ravitch, 2010). The emphasis on assessments as tools for accountability has diverted attention from their more fundamental purpose of adjusting practice to assist student learning. Teaching in early childhood requires a balance of encouraging learning skills for school readiness and respecting that young children are still early in development. Developmentally Appropriate Practice (DAP) works to find this balance, providing children with a rich learning experience that is appropriate for their age. Within the U.S.

educational context, DAP has come to the center of the conversation again with the National Association for the Education of Young Children (NAEYC) having recently revised its recommendations for developmentally appropriate practices (NAEYC, 2022b). These recommendations offer guidance for early childhood instructors on a variety of topics. Bringing DAP into classrooms requires assessment methods that reflect the whole child's development. NAEYC Standard 4: Assessment of Child Progress outlines core aspects of assessments that support DAP (NAEYC, 2022b).

Developmentally appropriate practices in early childhood can be traced back to Friedrich Froebel's first kindergartens in Germany. He designed an environment for children to develop age-appropriate motor, language, social/emotional skills, and cognitive understanding (Jeynes, 2006). As Elizabeth Peabody, John Dewey, and others advocated for early childhood education in the United States (U.S.), they maintained similar goals (Pulliam & Van Patten, 2003). NAEYC's recommendations for DAP return to this idea, that is foundational to young childhood education, and asks

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a simple question that has a complex answer: How do we monitor and assess children's progress towards the goal of elevating children to their highest potential in regard to their complex individuality and place within the community?

In this paper, we describe three alternative approaches to education that use child-centered and developmentally appropriate assessment practices: Reggio Emilia (often shortened to Reggio), Montessori, and Waldorf (also called Steiner). Alternative forms of education, having followed a different trajectory than conventional education, can provide useful insights into different ways of approaching educational practice. The present call for DAP in particular presents an opportunity to look at lessons that can be learned from alternative pedagogies, as many alternatives, including the three unique pedagogies described here, were developed and designed with a commitment to developmentally appropriate practice (Edwards, 2002). We discuss these three systems in particular in part because they are long-standing systems and are well established globally, with estimates of over 5,000 Reggio schools worldwide (Creative Inspiration Journey School, 2016), about 20,000 Montessori (National Center for Montessori in the Public Sector, 2021), and almost 2,000 Waldorf schools at the kindergarten level (Freunde der Erziehungskunst Rudolf Steiner, 2020). Montessori and Waldorf also have well developed programs for older children. The information throughout this paper is presented from the perspective of early childhood education within the U.S., the context that is most familiar to the authors. However, these systems were founded outside of the U.S. and some of the research was also done outside of the U.S., providing clear applicability to other contexts as well.

These three established alternatives use strategies that provide insight into assessment practices that align with DAP. The strategies include considerations of how effective assessment happens, how children might self-assess, and the environment's critical role in nurturing the development of young children. These systems use many established assessment practices that align with DAP, and have done so for some time. Specific examples include portfolios (implemented in some Montessori classrooms), wall "documentation" panels (found in many Reggio environments), and learning stories (a hallmark of Waldorf schools).

Both NAEYC's recommendations and elements of Reggio, Montessori, and Waldorf focus on children's development embedded within the classroom environment. NAEYC's guidelines for DAP include methods that promote an environment allowing children to achieve their full potential and learn across all curriculum areas and domains, while emphasizing learning experiences that call to each child (NAEYC, 2022b). Although the NAEYC's DAP was not identified in the three pedagogical approaches we describe here, they are embedded in these early childhood education programs. All three systems actively create an environment

for children, creating a space where children have ownership of the classroom and can grow and develop autonomously. Purposely designed environments foster independence in the child's work and experiences and directly impact their social/emotional and cognitive learning. An environment built for children can accentuate the needs of the whole child – social/emotional, cognitive, and physical – while addressing their culture, language, and developmental characteristics.

An additional rationale for studying assessment in Reggio, Montessori, and Waldorf is that each approach has a well established and distinct philosophy of how young children learn. Philosophies align closely with respective curricula and how assessment is implemented. The school community works with children to determine projects for learning in Reggio (Wurm, 2005), each child's individual potential is the focus of learning in Montessori (Montessori, 1949/1995), and educating the whole child, spiritual as well as physical, is a pivotal factor of Waldorf (Steiner, 1996). Each approach is complex. Our goal is to provide an analysis of how one component, assessment, of these complex alternative early childhood approaches addresses current challenges and opportunities regarding progress monitoring.

As we turn towards an analysis of assessment in these three pedagogies – Reggio, Montessori, and Waldorf – we begin by looking at the term assessment and what assessment means. Then, we briefly discuss ideas related to the following questions that guided this paper: What are developmentally appropriate assessments? How should we assess early childhood? The three pedagogies provide examples of answers to these questions by established education systems. In each section, we indicate ways in which assessment practices in these three approaches align with NAEYC's Standard 4.

Assessments

The word *assessment* comes from the Latin term *assidere* or *adsidere* which is a combination of *ad* meaning "beside," and *sedere* meaning "to sit," thus originally meaning "to sit beside" (Online Etymology Dictionary, 2022). Vygotsky (1978) defined assessment as collecting data for the teacher to guide planning and instruction to ensure that the student is working in the "zone of proximal development." This harkens back to the Latin roots, where the teacher sits beside the student, collecting information in order to scaffold knowledge to help students work independently and find success in their work. However, the term assessment has evolved to mean a measure of knowledge and skills, neglecting the idea that the teacher sits beside the students and works together to determine students' growth towards proficiency.

Developmentally Appropriate Assessments in Early Childhood

Assessment supports learning by providing children, teachers, and families with feedback, and is a key way in which teachers get to know and understand learners in their classrooms. High-quality early childhood assessment is informed by developmental and cultural contexts (Bredekamp & Copple, 1997; Brown & Lan, 2013). Children ages 2 through 6 are learning about the world around them, how to control their movements, and how to become members of a school community.

The current term, authentic assessment, has shaped early childhood classrooms. Features of authentic assessments of young children include: (1) conducted within naturalistic environments; (2) use of multiple methods; (3) connection between the intent of the assessment and the way it is being used; and (4) participation of families in the assessment process (Bredekamp & Copple, 1997; Sandall et al., 2000). Because authentic assessment emphasizes the individual child, the feedback that it encourages teachers to give is often activity, rather than outcome, focused. This form of feedback encourages children's continued engagement with a variety of materials rather than children being able to recite back certain information (DeLuca et al., 2019). In our current test-based culture, undue emphasis is placed on assessing what has been learned, putting limited emphasis on the process of learning (Frans et al., 2020; Stiggins, 2005). When assessments instead are based on activity, feedback is centered on supporting student motivation to continue engaging in the activities. The form of assessments change the nature of the feedback they provide, and also change how they can be used to support learning. When considering how to integrate assessment into daily practice, it is critical to also consider what the assessment is, the nature of feedback it will provide, and how this feedback can and will be used to support future development, not just serve as an evaluation.

Naturalistic Assessments

Naturalistic observation is one form of authentic assessment used in many early childhood classrooms, forming a foundational element of the assessment process and providing information for continuous planning and teaching (Bentzen, 2009; Bradley, 2021). Naturalistic observation is a method that involves observing subjects in their natural environment. The goal is to look at behavior in a natural setting without intervention (Bradley, 2021). Observation allows the teacher to assess children's interactions, engagements, and the context of those behaviors. This is particularly important during play. Careful observation provides teachers with insight into

children's social development as they engage in both parallel and cooperative play.

In addition, observation allows teachers to adjust lessons and materials to ensure the spark of learning and development. Observation is an integral component of assessment in the systems we discuss in this paper. The underlying philosophy of each system strongly influences what characteristics are being observed in children and how observations are structured, which provides informative feedback for instructors.

Assessments Guiding Child-Centered Learning

Self-assessment can provide more immediate feedback than teacher-assessment, allowing children to learn with less instructor interruption, and help children learn independently (Cook, 2004). The ability of self-assessment to support independent learning can be particularly important in the autonomous environment of many preschool classrooms.

Immediate feedback provided by self-assessment allows children to have a stronger memory trace of their original mental processes, allowing errors to be more quickly corrected and encoded (Dihoff et al., 2004; Willingham, 2009). Self-assessment allows children the opportunity to see their mistakes without needing to wait for instructor feedback, making feedback temporally closer to the mistake and thus helping children learn more effectively. If a child discovers an area for improvement through self-assessment, attention is returned to the material, providing opportunity for immediate continued engagement and improvement. For example, if a child is practicing counting and they discover that they have missed a number in the sequence, this encourages them to go back and try to remember the missing number. This shifts the focus of assessment away from the outcome of perfectly reciting a set sequence to the learning process of discovering what portion of the sequence may still need practice. The distinction in this example may be subtle, but can make a large experiential difference.

Young children who have not yet fully developed a sense of their own learning, initially may have difficulty with self-assessment (Flavell, 1979; Schneider & Löffler, 2016). Self-assessment for preschool children does not require in-depth self-reflection, but allows children to see mistakes. Montessori education, in particular, includes opportunities for children to guide their own learning by engaging with carefully constructed materials and activities which provide direct feedback (Seldin & Epstein, 2003). Teaching preschool children to self-assess requires carefully designed materials, an environment conducive to self-assessment, and can lead to autonomous engagement and learning.

Assessments as a Process, Not an Outcome

Each of the three systems we describe emphasizes assessing the active process of learning. They center teaching and learning goals on helping children be motivated and interested in their work. Comfort in doing school work in turn helps orient children to the type of learning that happens in school environments and sets them up well for further learning. In other words, the assessment that happens in early childhood should be both developmentally appropriate and forward looking. Assessment should focus on fostering willingness and interest to engage with learning materials to inspire further learning and support continued development.

Aligned with the idea of “sitting beside,” assessment in early childhood emphasizes collection of data about children that is highly individualized. The teacher is an investigator who gathers evidence to illustrate how children learn and what they have learned. This form of assessment is authentic to how children are naturally developing, adapting to each individual child. Instruments such as anecdotal notes, narrative records, checklists, observations, surveys, projects, and student artifacts provide teachers with accurate indications of children’s understanding, development, and learning through life experiences in the classroom (Bentzen, 2009).

Regardless of definition or form, the goal of assessment is to help children’s learning by providing feedback (DeLuca & Hughes, 2014; Moss, 2003; Rawson, 2015). Assessment does not provide the tools necessary to complete these next steps, that is the role of curriculum. Notwithstanding, assessment informs how the curriculum will be implemented to best support any particular child. Early childhood is a time in which children are learning not just how to engage socially, but also how to engage with academic material. Centering early childhood assessment around social and academic engagement can place an emphasis not just on meeting learning goals, but can also create a more systematic way of meeting them.

Alternative Approaches to Early Childhood Assessment

Reggio Emilia

Reggio Emilia is a pedagogy founded in 1963 in Reggio Emilia, Italy, by a group of parents led by Loris Malaguzzi, looking for ways to support their children’s learning (Edwards, 2002). In its unique assessment practices, Reggio uses many of the recommendations put out by NAEYC in regard to assessments that align with DAP. The foundation of the Reggio curriculum is built on the concept of “Progettazione.” Progettazione is an Italian term used in Reggio to indicate the complex and unique way in which children complete independent projects (Wurm, 2005). At the core

of Progettazione are four pillars: the right to explore, the environment, daily life, and self-management. Instructors collaborate with children using guided questions, children’s thoughts, and reflections to create “Intento Progettuale,” or intended projects, which serves as a road map for assessment, providing a base from which teachers can write, reflect, and share the children’s work. Documentation is used as a powerful innovation of visible learning that happens through discussion and community. Now in the twenty-first century, the use of digital technology has become a powerful tool to document and capture learning among children.

Documenting Development

Documentation forms a central part of assessment in Reggio. Documentation can include any artifact of children’s thinking or learning process; it can be a drawing or art project, a transcript from a conversation with the child, or a photograph of the child engaged with a classroom material (Oken-Wright, 2001). Instructors systematically collect documentation according to specific projects that each child is completing, making this process adaptive to each teacher, child, and classroom (LeeKeenan & Ponte, 2018). Teachers often display documentation as a way to remind children of the work they have done and provide parents a sense of the work their children are doing. Through displaying documentation, the entire community becomes actively engaged in the learning that is happening, providing feedback not just for teachers, but also children and parents.

The process of documentation is reflective. In the moment of choosing what to document, teachers reflect on children’s engagement, creating small moments of informal assessment (Oken-Wright, 2001). This process is both backward- and forward-looking. To know what artifact is meaningful for an individual child, the teacher needs to look back and know where the child is developmentally. At the same time, the teacher needs to choose what artifact will best serve in understanding the child’s future development and will assist later instruction.

Once collected, documentation continues to be a helpful assessment tool, as teachers reflect on what can be learned from these records and how to use this knowledge for continued instruction. Teachers may keep reflective journals, describing evidence of children’s development or thought patterns, such as how interests or knowledge in a particular area change over time (Fyfe, 2012). Teachers may also curate displays of collected documentation, summarizing a child’s work. Both of these uses require careful assessment of the individual, needing a deep understanding of each child to integrate work the child has done across time.

Documentation is an iterative process, adapting to feedback from children and the school community; for instructors it helps assess children’s development, but it also serves

as an invitation for the future. Teachers may display or reintroduce topics from activities they have documented. By reintroducing a topic, teachers can clearly see how a child's thought processes may have changed, with documentation serving as an individualized benchmark based on personalized interests and ability levels. Further, by creating an environment with clear indicators of past experiences, children are encouraged to engage with these topics again, encouraging deeper engagement (Oken-Wright, 2001). Since children are free to choose whether or not to re-engage, this provides an additional opportunity for teachers to reflect on and assess children's learning (Fyfe, 2012). Suppose children do not re-engage as a teacher may expect, this can provide insight into the child's current interests and perhaps indicate their comfort of engaging with knowledge in a particular area.

Feedback for Family

Beyond serving an essential instructional purpose, documentation provides opportunities to share feedback with families. Much like a report card, instructors can share documentation with families to show children's learning (LeeKeenan & Ponte, 2018). Unlike report cards, this is content-rich feedback, providing parents with information on what happens during the school day and can directly involve parents in their children's learning by offering the opportunity to discuss related content at home. Sharing documentation is an invitation for parents to be involved in their children's learning. The process of using documentation as a form of assessment, highlights children's education as a socially constructive process (Fyfe, 2012; Malaguzzi, 1994).

Families play an active role in learning and are vital to the success of a child and a school. All families engage with and become a part of this process, allowing assessment to be not just a form of assessing learning but truly a part of the entire learning process. For example, an art project involving leaf rubbing may inspire children to look for different kinds of leaves, invite teachers to talk with children about the different shapes of leaves, and invite parents to point out different kinds of plants while commuting to and from school. Families participate in preparing materials for the classroom and support the learning by preparing events like having a botanist come to the classroom and share their expertise on plants. Each individual brings their piece to the learning process. Documentation does not and cannot fully capture these social connections, but serves as reminders of essential learning and instances of connection, allowing the teacher to guide the children's experiences. In the nido (infant environment), participation looks different and has an alternative purpose. "The work done there supports parents exploring topics of interest that relate to young children while facilitating the building of relationships among families" (Wurm, 2005, p. 127).

The NAEYC's recent revisions regarding DAP emphasize three central components that align with Reggio practice, and the other approaches we discuss: *commonality* in children's development, each individual child's *unique* characteristics and circumstances, and the *context* in which children learn and grow (NAEYC, 2022a). *Commonality* is present in the rich array of learning materials with varying levels of difficulty. Instruction is highly *unique*, *Intento Progettazione* are designed for each child, based on where they are individually and assessment through documentation is highly individualized (Table 1, Standard B). For Reggio in particular, *context* is also critical. The Reggio approach implicitly argues that children develop through social and physical exploration. Documentation is then used to assess the natural progression of children's development. Instructors actively collect documentation and routinely use information from collected artifacts to develop a deeper understanding of each child and how to provide individualized support (Table 1, Standard C). Reggio can be viewed as a social-constructivist approach, where children play a fundamental role in their own learning and all community members support this. Assessment through *Intento Progettazione* and documentation reinforces this socially-constructive process by providing a direct connection between the teacher, school community members, and children's learning (Table 1, Standard A).

Montessori

The Montessori approach to education was developed by Maria Montessori in the early 1900s in Rome, Italy. Montessori, initially trained as a physician, first worked with children who had cognitive delays. She was later asked to help direct a preschool for children ages 3 to 6 whose families lived in a low-income housing complex. Through her work, she created a theory of development centered around children's growth into independence and self-regulation as they engage in and concentrate on developmentally appropriate activities. At the core of her pedagogy is the premise that children have the desire and capability to establish themselves as independent and contributing members of society (AuCoin & Berger, 2021; Montessori, 1948/2007). At young ages, children's desire for independence takes root in perfecting skills they see adults engaged in, such as washing dishes and reading, made joyful through their genuine interest. As children mature, they become increasingly interested in abstractions and categorization (Montessori, 1948/2014). Montessori classrooms are multi-age, usually covering three-year age spans, ages 3 to 6 in the case of early childhood.

Table 1 National Association for the Education of Young Children (NAEYC) standard 4: Assessment of child progress

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- A Assessment of young children’s progress and achievements is ongoing, strategic, and purposeful. The results of the assessment are used to inform the planning and implementation of experiences, to communicate with the child’s family, and to evaluate and improve teachers’ and the program’s effectiveness.
 - B The assessment focuses on children’s progress toward goals that are developmentally and educationally significant.
 - C There is a system in place to collect, make sense of, and use the assessment information to guide what goes on in the classroom (formative assessment). Teachers use this information in planning curriculum and learning experiences and in moment-to-moment interactions with children—that is, teachers continually engage in assessment for the purpose of improving teaching and learning.
 - D The methods of assessment are appropriate to the developmental status and experiences of young children, and they recognize the individual variation in learners and allow children to demonstrate their competence in different ways. Methods appropriate to the classroom assessment of young children, therefore, include results of teachers’ observations of children, clinical interviews, collections of children’s work samples, and their performance on authentic activities.
 - E The assessment looks not only at what children can do independently but also at what they can do with assistance from other children or adults. Therefore, teachers assess children as they participate in groups and other situations that are providing scaffolding.
 - F In addition to this assessment by teachers, input from families as well as children’s own evaluations of their work are part of the program’s overall assessment strategy.
 - G Assessments are tailored to a specific purpose and used only for the purpose for which they have been demonstrated to produce reliable, valid information.
 - H Decisions that have a major impact on children, such as enrollment or placement, are never made on the basis of results from a single developmental assessment or screening instrument/device but are based on multiple sources of relevant information, including that obtained from observations of and interactions with children by teachers and parents (and specialists, as needed).
 - I When a screening or other assessment identifies children who may have special learning or developmental needs, there is an appropriate follow-up, evaluation, and, if indicated, referral. Diagnosis or labeling is never the result of a brief screening or onetime assessment. Families should be involved as important sources of information.
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Standards are from NAEYC (2022b)

Self-Assessment Through “Control-of-Error”

In her first school, Montessori used many of the materials that she had used to teach children with cognitive delays. These materials had built-in methods for self-assessment. For example, to teach writing she used a board with carved out letters and a stylus, creating a clear indication of a mistake when the stylus left the groove. Montessori described this element as a “control-of-error” (Montessori, 1948/2007, p. 105; p. 197). All materials in Montessori classrooms today are designed with a control-of-error, providing immediate and on-going feedback (Lillard & McHugh, 2019). For example, the “pink tower” consists of ten cubes ranging in size from one to ten cubic centimeters. Children are instructed to order and then stack cubes from largest to smallest. Since cubes are of different sizes, children are readily able to see when they have selected a cube of the incorrect dimensions as their final cube will not be the smallest.

The pink tower lesson highlights additional points in Montessori lessons. The ten cubes are stored in tower formation, providing an on-going visual representation of the correct tower. When giving the lesson, instructors initially demonstrate how to carry each cube separately and place them on a rug or work mat. As children do this on their own, they have the opportunity to feel the dimensions gradually increase in size and weight. Teachers intentionally pause as they select which cube to stack, looking carefully at each remaining cube. After completing the tower, the teacher

demonstrates how to disassemble the tower by placing each cube carefully on the rug. Last, the teacher carries the cubes one by one back, stacking them back into a tower, inviting the child to then take the tower out independently (Montessori, 1914/1965). These lessons are typically silent, helping children focus on the visual dimensions of the cubes and the control-of-error that this visual provides (Montessori, 1949/1995). When engaged with this material alone, children are able to monitor their own progress, sometimes sharing their success (“I did it!”) aloud. This form of self-assessment is affirming and meaningful. Children learn “to cultivate a friendliness towards error, to treat it as a companion inseparable from [their] lives, as something having a purpose, which it truly has” (Montessori, 1949/1995, p. 246).

Self-assessment places children’s attention on continuing engagement. For example, each step of hand washing has the opportunity for self-assessment: When applying the appropriate amount of soap, are there enough soap suds yet? When scrubbing and rinsing hands, are all the soap suds rinsed off? When drying hands, do hands feel fully dry? As this example demonstrates, self-assessment efficiently keeps children’s attention concentrated on the task, where outcomes-based assessment may only focus on the child ending with clean hands.

As each child explores any Montessori activity, the material’s control of error provides an opportunity to self-correct, but also for teachers to assess. Teachers observe how

individual children use this built-in corrective component in authentic activities. For example, does the child fill the water pitcher for table washing to a clear mark for a workable amount of water? Or does the child under or over fill the pitcher? How does the child compensate if they have too much or not enough water? Montessori teachers receive intensive training regarding observation (O'Shaunessy, 2016). They learn how to observe children as they concentrate fully on activities ranging from pouring water to building two, three, and even four digit numbers with concrete materials. Teachers record variations of how individual children carry out activities across curricular areas.

Self-Assessment Supports Self-Determination

Montessori pedagogy is grounded in self-determination characterized by individualized, self-paced learning. Montessori emphasizes that instructors “must give the children freedom and relaxation from the continuous direction of adults” (Montessori, 1979/2008, p. 75) clearly stating that “if teaching is to be effective with young children, it must assist them to advance on the way to independence” (Montessori, 1948/2007, p. 58). A typical school day is built around three-hour work periods. During this time, children are given short lessons by instructors, then are given the freedom to observe their peers, or select materials independently to work with alone or in groups. Lessons and demonstrations of the Montessori materials are considered a point of departure from the typical routine of self-determined work. For example, a teacher may present a lesson, carefully building a tower of cubes, then invite individual children to explore dimensions of the cubes and build their own towers. In this way, children's engagement (often referred to as “work” in Montessori to dignify their activity) remains self-determined as they choose work according to their own previous experience with blocks, maturation, as well as individual approaches to creativity and interest in exploring the cubes all affect how each child uses the material.

Focusing on individual children provides Montessori instructors with time to assess learning during lessons. This is evident in the three-period lesson, where the first period is naming, second period is recognizing, and the third period is remembering (Montessori, 1948/2007). For example, in learning language cards, during the first period the child is told the names of a small collection of pictures or objects, usually three related items. In the second period, the child identifies each item several times by responding to the teacher's request of identifying vocabulary: “give me the cardinal” or “place the robin here.” Finally, in the third period the child is asked to verbally state the name of each item. Three-period lessons assess the child's level of understanding, indicate if the child will benefit from additional practice

(second period), or confirm if the child has mastered the content and no longer needs teacher guidance. The Three Period Lesson also provides ample opportunity for authentic, low-stakes assessment. For example, as the child practices building words with cut-out letters (the “movable alphabet”), can they point to “cat”? Or do they point to “hat”? In reviewing the child's written list of -at words (work sample), can the child read the words correctly (third period)? If not, where are the child's specific errors?

As mentioned above, the NAEYC's recommendations regarding DAP emphasize *communality* in development, *unique* characteristics, and *context*, all central to Montessori (alignment with particular standards are noted in parentheses). Didactic materials are available to all children. Materials address developmentally appropriate concepts across curriculum areas (e.g., math, literacy/language, social studies, the arts, science). Lessons and demonstrations are given based on children's observed interests and readiness (Table 1, Standard D). Children build their understanding of concepts as they engage with sequenced lessons and learn as they select and engage with carefully designed materials (Table 1, Standard G; Culclasure et al., 2019). For example, children in an early childhood classroom develop an understanding of number as they progress through counting sets of wooden spindles from one to ten in a box with ten sections, begin recognizing numerals by tracing sandpaper representations, and eventually sequence numeral cards from one to ten and lay out the correct number of counting chips for each card.

DAP's component of uniqueness occurs as each individual child selects and engages in learning activities independently. No two children progress through lessons and presentations in the same way. Teachers share their observations of each learner's progress in using the wide array of Montessori materials and interacting appropriately with peers during regular family meetings throughout the school year (Table 1, Standard A). Observations and family collaboration inform teachers' decisions regarding specific lessons and supports provided for individual children. By encouraging independent engagement, control-of-error gives teachers the leeway to teach children individually and adapt lessons for each child. Montessori classrooms address contextual learning by reflecting children's neighborhoods and family experiences. A Montessori classroom in rural Minnesota may include opportunities to learn about ice fishing and raising milk cows, while a classroom in urban Washington DC perhaps offers a hip-hop listening corner. Both might address current cultural topics and issues by engaging children in well-being activities such as yoga and conflict resolution.

Waldorf or Steiner Education

Waldorf Education was developed by Rudolf Steiner in 1919 for children of factory workers in Stuttgart, Germany. Steiner was a theosophist who was founder of the anthroposophy movement. Anthroposophy is centered on the idea of spiritual development through careful thought and perception (Steiner, 1996). It emphasizes the individual experience through engagement with the world and in community. Waldorf is strongly grounded in anthroposophy and the corresponding theory of child development. Although the spiritual and anthroposophical ideas central to Waldorf may not align with many educational spaces, many lessons can still be learned from this long-standing system that emphasizes extreme care in listening to each child. The very well established assessment practices used in Waldorf fundamentally put the child at the center of education.

The anthroposophical view of child development describes children gradually integrating their physical, spiritual, emotional (labeled sentient), and individual (labeled ego) sense of self. Steiner divided child development into three seven-year cycles, with development in each cycle focusing on children integrating their sense of self through “willing,” “feeling,” and “thinking” respectively (Steiner, 1996). In the first seven-year cycle, when children are becoming familiar with being in the world, they learn to act through willing control of their body. During the second and third seven-year cycles, development focuses on different characteristics, integrating feeling and thinking to form a well-developed sense of self. Waldorf education seeks to create appropriate practice within this developmental framework, fostering children’s joy for learning through supporting the needs particular to each age group. Play is a central part of this process (Sobo, 2014). Children are invited to engage with activities in a way that is self-determined, always inviting children into a joyful experience that can help them to develop new skills.

Inviting Engagement

Central to Waldorf teaching are invitations to children, invitations to move their bodies, invitations to join social groups, invitations to experience the wonder of the world around them, and with these an invitation to experience the great joy of learning. Movement is foundational in the first seven-year cycle as children focus on developing their sense of willing, learning to enact their will in the world. Early childhood classrooms and curricula include a variety of materials and lessons encouraging gross- and fine-motor movement. Lessons often take the form of stories that include invitations for movement (Finser, 1994). For example, “The Turnip” is a folktale of a turnip so large that Grandfather cannot pull it out of the ground himself and requests help from

Grandmother and eventually the whole family. After hearing this story, children may act it out as a class, inviting them to imitate the actions and experiences of the characters. “The Turnip” may also be accompanied by gardening and the way in which Grandfather asked for help gives an example for children that they too can ask for or give assistance to others, without being directed to do so. Stories are accessible to children of this young age and excite their imagination.

The physical classroom is also curated to invite children into the space and to move in it. A Waldorf environment is calm and enticing. An example of this in classroom materials are Steiner dolls, which are painted in attractive colors that draw attention, with paint only indicating basic facial features. The lack of detail encourages children to use imagination as they play. Simple wooden toys with the same design elements represent animals and fantastical creatures that may make appearances in stories told to the class, inviting children to replay stories, again integrating stories as a vehicle for learning. For example, children may stack animals as they have heard in the “Bremen Town Musicians” often adding new animals to this merry band. If a child accepts these invitations, their experience is rich, having listened to the story, imagined the characters, let imagined characters be represented by these dolls, and have begun to internalize the story through reimagining and retelling. Classrooms also often include lofts made out of natural wood for children to climb and woodworking tools inviting children to work with their hands. Through this open-ended play, the child “brings his own will into activity, into movement. Because of the way in which the external objects behave under the influence of the will, it then happens that the child educates himself for life, simply through play” (Steiner, 1995, p. 11).

Waldorf instruction assumes an innate interest and desire to learn. Education is built on the premise that through fostering children’s interest and sense of wonder for the world, children will grow up to be lifelong learners. This approach is a holistic one, focusing on connections between a child’s interest and material. The open-ended invitations characteristic of Waldorf pedagogy are designed to help children build a sense of self-efficacy and interest, setting children on a path towards life-long learning. The instructor’s role is to present invitations for open-ended engagement that support development. The instructor should learn to “recognize interests lying within the child’s character,” fostering children to reach their potential through following their interests in play (Steiner, 1996, p. 79). To do this for each child, the instructor must intimately know each and every child. This happens through careful observational assessment.

Observing Children’s Development

Assessment in Waldorf early childhood relies on observing development and deeply understanding each child (DeLuca

& Hughes, 2014; Murphy-Lang, 2010). At early ages, supporting children's enjoyment of the learning process is key and assessment is rarely on whether children can achieve an outcome, but rather on their personal growth. Steiner designed the Waldorf pedagogy and curriculum based on a particular view of child development. This view includes an emphasis on integrating parts of the self, with a focus on learning willingly in the early years. Teachers use developmental knowledge as a base for their observations, a process that may include simply using this framework to understand why a child acts in a particular way, or comparing children's demonstrated behavior to particular trajectories. Trajectories provide a starting point for understanding each child, for example when most children may begin drawing shapes and when human beings start playing a central role in drawings (O'Connell, 2018). However, assessment truly occurs in interacting with and seeking to understand the child through their words and actions. Through observation on how children are developing in each domain, instructors gain an individualized picture that can inform how to support learning and what invitations will work best for each child. For example, to help a child who struggles with coordination, an instructor may invite play that includes throwing and catching.

Teachers take daily notes on each child's engagement and reflect on how to engage them going forward (Ciborski & Ireland, 2015; O'Connell, 2018; Rawson, 2015). Depending on the needs of assessment for any particular child, sometimes a more in depth assessment is necessary and a teacher may do a "child study" focusing efforts on observing only one child. Child studies often include talking with families and other faculty to gain multiple perspectives before setting goals for that child (Murphy-Lang, 2010; O'Connell, 2018). Talking with families also gives instructors insight into how classroom behavior transfers to home environments and what families' goals are for their children. On-going discussions of children among faculty helps teachers recalibrate assessments of particular children. This practice also helps the entire community be aware of each child and creates an expectation that the entire community is supporting the development of each and every child.

A primary goal of early childhood education in Waldorf is instilling a sense of wonder. Given this goal, assessment is often done in a way that is invisible to children, protecting the often fragile interest that occurs when children first interact with new material. Assessments are rarely discussed with children, allowing children to focus on engaging and enjoying learning for the sake of learning and not judgment from adults. Observational assessments allow for this. Despite assessment being invisible to children, the regularity of assessments and their integration into the pedagogy is comprehensive. Teachers benefit from the deep knowledge they obtain regarding each individual child's complete

development. Teacher notes are compiled over time, providing important contextual information for teaching each child through the years, into grade school as well (Finser, 1994; Murphy-Lang, 2010). In later grades, reflections are also used as a foundation for formal yearly assessment letters given to families, noting developmental changes throughout the year in addition to more traditionally academic accomplishments. This whole child approach emphasizes children's individuality, making assessment much more about personal comparison than comparison across peers.

Like the two other systems already described, Waldorf places importance on the three themes of *communality*, *uniqueness*, and *context* from NAEYC's recommendations regarding DAP (alignment with particular standards are noted in parentheses). Communality is present in the format of lessons and the equal availability of materials. The stories shared with the class and teacher-led activities are done together as a class, creating shared experiences that can inspire play and bring the class together. The classroom and materials designed to support children's development, particularly motor development, are also shared and available to all children. The assessment practices in Waldorf are highly focused on seeing each child as a unique individual and are designed to be ongoing to show individual growth (Table 1, Standard A). The context of assessment is also critical and has several layers. Like the other systems already described, Waldorf classrooms are carefully designed to provide an environment amenable to learning and the observational assessments characteristic of this pedagogy. Context is also central in the perspective of assessing children's development more than their ability at any particular time (Table 1, Standard H). With this, the use of child studies also brings in broader perspectives of context from children's home environments and perspectives from many instructors as well (Table 1, Standards E and F). The highly specialized and individualized nature of this form of observational assessment makes it appropriate for each child developmentally, creating a deep connection between child and teacher and placing a critical emphasis on each child's learning rather than their ability at any particular moment in time.

An Alternative Assessment Paradigm

Assessment serves to monitor students' progress and provides feedback about learning. In the framework of developmentally appropriate assessment, it serves both to help instructors determine a general guideline of where children are in development and how to support the next step in development. We discussed three alternative systems from which we can learn unique methods of assessment for early childhood education. Each draws from a theory of development, creating assessments and environments that

are developmentally appropriate. The forms of assessment these systems use are not about determining what information children have memorized and can recite back, but rather engage children in work designed to help them learn about and foster a sense of wonder for the world around them. This is distinctly different from standards-based tests that often happen outside of day-to-day learning and pull children out of the learning process. As such, they offer an opportunity for a new paradigm in early childhood assessment, one we contend is well timed in view of current calls for alternative approaches to developmentally appropriate forms of assessment (Lam & Wong, 2020).

These three systems reveal the power of observation as a form of assessment regarding individual development, not just skills or knowledge. The most recent research published in 2014, suggests that accurate feedback based on such observation instruments can be a powerful resource for improving teaching and learning in the classroom (Peterson & Elam, 2020). However, alternative assessments can easily be overlooked and not given the credit they deserve due to the fact that inaccurate practices can have a significant impact on the teachers and their students. Capturing behaviors in the natural environment requires intense training and continual improvement.

Though these three systems are distinct, their unique formats of assessment have common traits that align with NAEYC's call for developmentally appropriate assessment: assessment is done through daily activity, assessment focuses on children having done an activity, and assessment inspires continued learning. First, assessment is done through daily activity (Table 1, Standards A, C, and G). In Reggio, the process of documentation addresses artifacts from on-going activities, such as drawing and having conversation, rather than separating out assessments. In Montessori, assessment occurs through control-of-error while children concentrate on self-selected daily activities. Instructors use children's deep engagement as an indicator that children are interested and doing work that is helping their development, giving a starting point to motivate and begin lessons (Ervin et al., 2010). In Waldorf, assessing engagement also addresses daily activity, both children's current activity and their willingness to engage with new activities.

Second, assessment focuses heavily on the child's active engagement rather than only on learning outcomes (Table 1, Standards D, E, and H). In Reggio, documentation is evidence of a child having engaged with an activity or an idea and acquired knowledge on a particular topic. In Montessori, a key form of assessment is also whether the child has engaged with, concentrated on a material, and ultimately acquired the relevant concepts. Similarly, in Waldorf the ability to engage with and learn through an activity is a foundational part of assessment, usually based on children's interest. These themes are certainly present in other

assessment practices, but the strength with which these systems employ a focus on engagement is unique.

Third, assessment inspires continued learning (Table 1, Standards B and F). Displays of documentation inspire further interaction with the same ideas, spurring new learning opportunities in the Reggio environment. Self-assessment through control-of-error in Montessori invites children to immediately correct mistakes and is one of the primary ways in which children learn. Even teacher-led assessment through the three-period lesson blurs the line between assessment and learning so much that the two often cannot be separated. A central theme of assessment in Waldorf is children's individual development and ability to engage completely and respectfully with the world around them. Assessment involves observing children's development in a myriad of traits, helping instructors deeply understand each child and how to best support each child's learning. In these systems, the forms of assessment rarely remove children from the learning process, making assessment explicitly about continuing child engagement and allowing instructors to dedicate every day to the educational goal of learning.

Indeed, assessment of knowledge in Waldorf is often seen through the lens of development, such as seeing the development of fine-motor skills through finger knitting, or seeing increased detail in drawings as a representation of developmental change (Strauss, 2007). In Montessori, the structure of providing independence means children are assessed on their ability to actively choose and engage with materials (Montessori, 1936/1966). Similarly, documentation in Reggio is not just to understand what the child is learning, but also how they are engaging with and thinking about that learning. In each case, assessment honors children's engagement with the world around them.

We believe the unique assessment practices used by these three systems are beneficial for children with diverse backgrounds and circumstances. For example, the Division of Early Childhood (DEC) of the Council for Exceptional Children emphasizes engagement in purposeful activities, in particular daily routines, as best practice for children with exceptionalities (2022). All three systems strive to actively include all children in the learning process with assessment practices that adapt well to children with varying needs. Reggio pedagogy focuses on learning through interactions in community, with a strong emphasis on inclusivity of all community members (Malaguzzi, 1993; Vakil et al., 2003). The careful observation of individual development in Waldorf is a strengths-based approach, emphasizing how to support each individual child, regardless of their unique differences (Murphy-Lang, 2010; O'Connell, 2018). The strong emphasis on whole child assessment in both Reggio and Waldorf make them particularly common choices for parents of children with exceptionalities across countries (e.g., Gilman, 2007; Magnússon et al., 2015). Montessori explicitly

began as a pedagogy to support children with exceptionalities as they learned to care for themselves, their surroundings, and one another (Kramer, 1976). Effective collaboration between Montessori and special education continues in today's learning environments (AuCoin & Berger, 2021). Debs (2016) addresses racial diversity in Montessori, noting both successes and challenges encountered by Montessori public schools serving children of color. Additional research is needed to illustrate how all three systems provide equal opportunities to assess, but historical intent and parent choice both show some parents see these practices as best meeting the needs of their children from diverse backgrounds.

Further continued investigation on the use of authentic forms of assessment with older children would also be beneficial. Montessori and Waldorf are well established in older grades. As children get older and the type of work they do changes, assessments do become more complex. For example, control-of-error for complex intellectual work becomes less about whether the material can be completed and more about matching work to a set standard such as the solution to a math problem, or the comprehensibility of a written report (Montessori, 1948/2014). Similarly, in Waldorf assessments of engagement shift towards meeting set expectations. Instructors help children revise work several times before a polished version is put into a portfolio (Ciborski & Ireland, 2015). Despite shifting the focus to meet specific standards, the same principles of designing work with built in controls-of-error and emphasizing engagement and enthusiasm remain central.

Conclusion

Developmentally appropriate assessment is based on informed observations of children's active engagement in meaningful activities—the “what” of assessments. Understanding individual child progress is the goal of assessments. Both the child's teacher and the child contribute to meaningful assessments—they are “who” should assess learning. Activities in high-quality early childhood classrooms that engage children in learning provide opportunities for growth across developmental domains. The child's engagement is the focus—the “what”—of assessments. Authentic assessment in the form of careful observation of children's engagement provides rich, meaningful, and informative information regarding individual children's growth and development. Observations are supported through activity that meaningfully supports further assessment and knowledge of each child, using documentation panels (Reggio), control of error and three period lessons (Montessori), and engaging in story-telling and expressive art (Waldorf).

We acknowledge that this review has several limitations. First, these three approaches are complex. While we selected and reviewed relevant components of assessment, to fully learn what these systems have to offer, additional study of how each addresses assessment is needed, including how assessment is integrated across ages. For example, an in-depth study of socially-constructivist learning, observation, concentration, or learning through storytelling across the three approaches would further inform the broad issue of appropriate and effective assessment. Second, Montessori and Waldorf classrooms first appeared over a century ago and Reggio was established over half a century ago, begging the question of relevance. Have they kept up with current research-based best practices regarding assessment? While our analysis points out effective components of each, our exploratory review does not involve collecting data to address how assessment is accomplished in the three approaches. Rich information could result from a targeted comparative study across schools that implement Reggio, Montessori, and Waldorf. For example, a mixed methods study addressing specific variables (such as engagement, self-correction, and motivation) through both quantitative and qualitative lenses could inform effective, developmentally appropriate assessment of young children's learning.

The NAEYC's call for developmentally appropriate assessment of young children's learning serves both to provide children with high quality opportunities and continues a mission that has been present in early childhood educational reform since Froebel's ideas of the first kindergarten being a place where children learn to acclimate to the environment of school above particular knowledge goals. In this paper, we have provided a brief overview of early childhood assessment in Reggio, Montessori, and Waldorf, which demonstrates that assessment can be a joyous and fully integrated part of the learning process. These systems redefine assessment, using careful observation from all members of the community, artifacts of children's engagement, and uniquely structured lessons. They emphasize learning through engaging with the world, and use children's natural affinity to explore and in some instances, assist self-assessment. They redefine what should be assessed, focusing on assessing engagement above knowledge and creating an environment that supports child development.

Although there has been little large-scale systematic research of observational assessments similar to what these systems rely upon, the internal work within these systems have created strong and well-developed traditions of this type of assessment. As continued research regarding the validity and reliability of observation-based assessment is conducted, Reggio, Montessori, and Waldorf provide examples of developmentally appropriate assessments. These

practices can encourage children to be enthusiastic about working hard and engaging in effective, good, and beautiful work, all skills that are important not just in early childhood settings, but are essential traits throughout later schooling and life.

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