Implementing the Ages and Stages Questionnaires in a Montessori Setting

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Abstract: Montessori educators face increasing demands to support growing numbers of students who have developmental delays or disabilities, and early detection and support are essential. Yet, detecting developmental delays is a complex task, and early childhood educators do not typically receive specialized training. The Ages and Stages Questionnaires (ASQ) is a set of valid and reliable developmental screening tools widely used in education and health settings, but ASQ use has not been assessed in Montessori settings. In a pre/post, multimethod design, this study examined the perceptions and impact of an ASQ training—adapted for Montessori settings—for guides and administrators. The results suggest the ASQ training and implementation of its tools were perceived as beneficial and valuable. The training positively influenced participants' attitudes and beliefs, skills and knowledge, confidence and self-efficacy, and access to resources. Alumni of the training had similar attitudes and beliefs, as well as confidence and self-efficacy, compared to recent trainees, although alumni's skills and knowledge, as well as access to resources, were more advanced than the recent trainees. Qualitative findings also point to the benefits of the training while highlighting the realities, needs, and challenges Montessori educators face. This study provides evidence that Montessori educators benefit from ASQ developmental screening training. Through ASQ training and implementation, Montessori educators can gain a better understanding of students' developmental milestones, more effectively observe their students' behaviors, and more confidently advocate for students' support needs.

Early detection and support in schools are essential for young children who have developmental delays or disabilities (Hirai et al., 2018; National Center for Learning Disabilities, 2020). However, a significant number of developmental disabilities and delays go undetected, potentially hindering children from reaching their full potential (Weitzman et al., 2015). Like other teachers, Montessori educators face increasing demands in their schools to support growing numbers of students who have developmental delays or disabilities. The current national estimate of school-age children who have at least one developmental disability is about 17%, or one in every six children—a number that has been on the rise since it has been tracked (Centers for Disease Control and Prevention, 2024). The COVID-19 pandemic intensified the demand and urgency of supporting these students since their behavior could not be easily observed during distance learning (Macy, 2022).

Extensive research highlights the benefits of universal early screening and intervention for developmental delays (Hirai et al., 2018; National Center for Learning Disabilities, 2020). However, despite federal requirements to identify such students (U.S. Department of Education, 2017), educators receive little funding or training to effectively detect and support developmental disabilities, and build positive relationships with caregivers while doing so. Montessori educators, like others, face challenges in identifying and supporting children with developmental delays or disabilities (Danner & Fowler, 2015; Epstein, 1998; Long et al., 2022), hindering the creation of truly inclusive educational spaces and positive teacher-caregiver relationships.

The education and welfare of children depend on effective educators and systems that nurture their growth. Montessori schools, known for their unique pedagogical philosophy, aim to cater to the distinctive needs of every child, emphasizing individualized instruction and holistic development. As a result, many families seek Montessori schools to support their children's optimal development. Even though Montessori schools are a natural choice for many families, Montessori guides and administrators sometimes feel unprepared to meet the diverse needs of students and their families (Epstein, 1998; Long et al., 2022). In this context, the Ages and Stages Questionnaires (ASQ), a universal developmental screening tool and training modality, emerged as a promising strategy for Montessori programs, enabling Montessori educators to identify students' developmental delays in collaboration with parents and caregivers.

The ASQ tools can also facilitate crucial conversations with caregivers, potentially ensuring children get the appropriate interventions, resources, and support they need.

However, the ASQ training and implementation guidelines had not been previously adapted for use specifically in Montessori schools—an important step, given Montessori programs' unique pedagogy, settings, and practices. For instance, in addition to learning about Montessori's unique theory of development (i.e., the planes of development), Montessori guides also receive specialized training on how to observe and engage with children in the classrooms and how to interact with caregivers. Therefore, in 2019, a Montessori-specific ASQ training was designed by ASQ trainer and AMI Montessori guide Dalia Avello-Vega to equip Montessori educators and administrators with the knowledge and skills necessary for effective implementation of this tool specifically in Montessori settings.

Although the ASQ is well-regarded in traditional settings, given the unique education approach and training of Montessori practitioners, it is important to examine empirically how Montessori educators perceive the training and implementation of the ASQ. To address this, a research study commissioned by the Association Montessori International of the United States (AMI/USA) was conducted during the 2022–2023 academic school year to explore the outcomes, perspectives, and experiences of Montessori guides and administrators who were trained to use the ASQ in their schools.

About Montessori

Montessori education, as originally conceived by Maria Montessori, was designed to serve students with special needs. Montessori created the Montessori Method in alignment with her developmental theory, the planes of development, which she identified through her direct observation of children (Montessori, 1971; 1989). More detailed elaboration is provided by Murray and colleagues (2020, p. 205), concerning the life of Montessori and the Montessori approach:

> *Maria Montessori was one of Italy's first female physicians, and she developed a groundbreaking educational method based on astute observation of children's behavior while working in one of the poorest neighborhoods in Rome (Gutek, 2004; Kramer, 1988). . . . She was a woman before her time in suggesting that children learn through hands-on activity, that critical brain development*

occurs during the preschool years, and that children with disabilities could and should be educated (Montessori, 1912b). . . . Montessori education is an individualized approach with a long-term perspective. Children remain with the same teacher [ideally] in multiage classrooms for three years, allowing for continuity in the learning experience (Montessori, 1912b). In this environment, children work at their own pace with opportunities for cooperative learning while working in small, mixed-age groupings according to ability and interest (Montessori, 1912b; Montessori, 1972). Montessori programs typically limit the emphasis on whole group instruction, grades, and tests and instead focus on student-chosen work with specially designed materials during long blocks of uninterrupted time (Montessori, 1912b; Montessori, 1965a; Montessori, 1965b).

Today more than 3,495 Montessori schools in the United States (National Center for Montessori in the Public Sector, 2023) follow the distinct Montessori philosophy along with its accompanying practices and emphasis on nurturing environments. Such practices embody a promise for the welfare of all children, including those with disabilities (Long et al., 2022).

Teacher Training and the Preparation of the Adult

Teacher preparation is crucial for ensuring that educators are equipped with the necessary knowledge, skills, and competencies to effectively manage classrooms and facilitate student learning. Typical teacher preparation tends to be competency-based; however, teachers also need knowledge of behavioral strategies, identification of special needs, curriculum adaptation, legal regulations, and collaboration skills to effectively support inclusive classrooms (Kamens et al., 2000). Given the evidence suggesting students with disabilities fare better in inclusive classrooms (Downing & Peckham-Hardin, 2007; Kefallinou et al., 2020; Van Mieghem et al., 2020), general education teachers need special training pertaining to developmental disabilities and inclusive education practices. Mounting evidence supports the premise that general education teachers who receive training in special education are better at implementing inclusive practices (Zagona et al., 2017). Importantly, whereas teacher training is crucial to preparing educators for the classroom, also critical is ongoing professional development beyond initial training to refresh knowledge and skills as well as learn the best practices from cutting-edge research (Creemers et al., 2012; Van Mieghem et al., 2020). Moreover, a team including specialists and highly trained personnel with expert knowledge in special education can ensure a truly inclusive education experience (Division for Early Childhood of the Council for Exceptional Children, 2014; Mastropieri et al., 2011).

For classroom preparation, guides receive Montessori-specific teacher training aligned with the Montessori pedagogy. For example, in Association Montessori Internationale (AMI) training,

> *… trainees study the Montessori philosophy about child development and how to practically apply it in their work with children. [Trainees] engage in a deep study of Montessori theory and practice through lectures and demonstrations on [the] use of the Montessori materials that support the child's development at each plane, as well as practical application through observations and practice teaching. (R. Sabater, personal communication, September 18, 2024)*

While Montessori teachers receive training on child development, it is the authors' understanding that some Montessori training does not include in-depth focus on developmental delays or disabilities. There is little publicly available information on the content of Montessori teacher training; therefore, the conclusions we can draw are limited. However, personal communications and web data confirm the focus on early childhood development, educational pedagogy, observations, implementation, and classroom management in Montessori teacher-preparation programs (American Montessori Society, n.d.; Association Montessori Internationale, n.d; S. Werner Andrews, personal communication, August 22, 2024). Few of the courses involve the same depth and preciseness of understanding developmental disabilities as is reflected in the ASQ training. Evidence from research studies suggests that, like traditional educators, many trained Montessori educators feel underprepared to identify and support children who have developmental delays or disabilities (Danner & Fowler, 2015; Epstein, 1998; Long et al., 2022). Montessori educators may benefit from additional training to support students who have developmental challenges.

Developmental Screening Tools and the ASQ

Early detection with developmental screening is critical for identifying students who have special needs so a diagnosis and support plan can be established.

Figure 1.

Typical ASQ Developmental Monitoring Implementation Flow for Montessori Programs
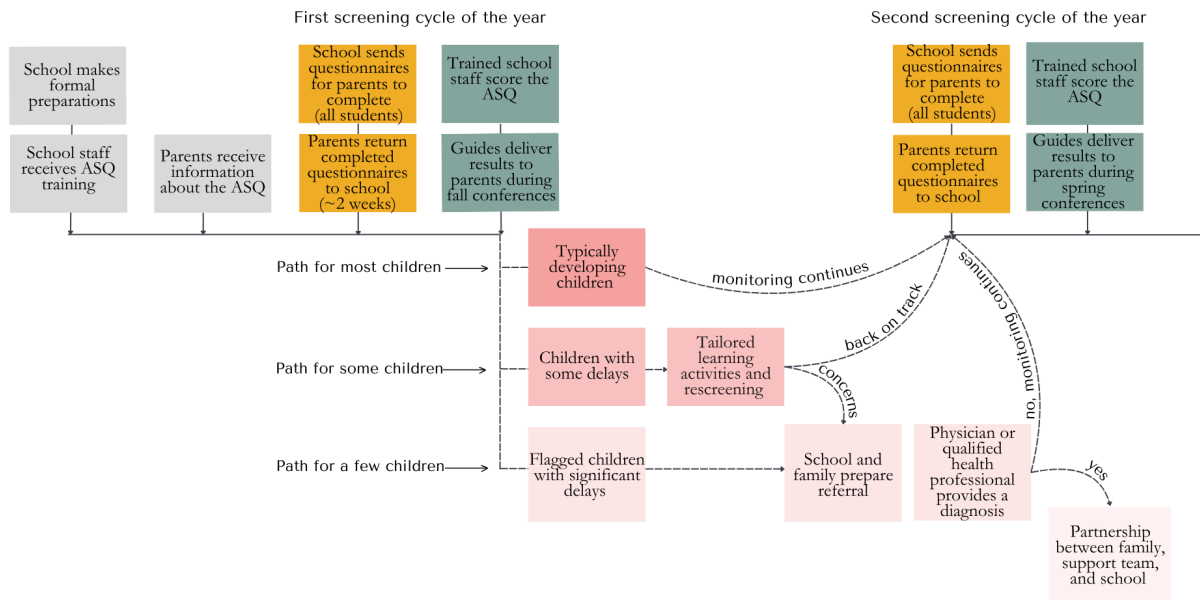
Standardized screening tools allow for systematic, continuous monitoring and evaluation, which are essential for effective intervention and creating successful environments for students and families (Khan, 2019). To meet this need, a variety of developmental screening tools have been created. An exhaustive review of developmental screeners is beyond the scope of this paper; however, we provide a brief overview of several key considerations for selecting an appropriate developmental screener. For example, developmental screeners can vary regarding content (e.g., motor, social, cognitive, behavioral), completion time, financial cost, reliability and validity, standardization, and who completes the screener (Rydz et al., 2005). The appropriateness and usefulness of each type of screener depend upon the needs of the community. The Ages and Stages Questionnaires (ASQ) was selected to be adapted and utilized in the Montessori setting—and as the focus of this study—because the questionnaires are relatively easy to train and implement in collaboration with families. Additionally, the ASQ is widely used, research-based, standardized, culturally sensitive, and translated into many languages (Bricker et al., 2010; Macy, 2012; McCrae & Brown, 2018).

The ASQ training and tools facilitate identification of developmental delays among children ages 0 to 6. The questionnaires are divided into two tools:

1. Ages and Stages Questionnaires, Third Edition (ASQ-3) measures development across five areas—fine motor, gross motor, expressive and receptive communication, problem-solving, and personal-social.

2. Ages and Stages Questionnaires: Social-Emotional, Second Edition (ASQ:SE-2) focuses exclusively on socioemotional indicators. The questionnaires can be used across different settings including early childhood education (Veldhuizen et al., 2015).

The ASQ is a parent-completed set of standardized universal screening tools developed by a research team at the University of Oregon to produce an effective and culturally sensitive set of questionnaires that are also valid and reliable (Bricker et al., 1988). The ASQ enables trained guides to work with caregivers to detect delays, engage in vital and potentially challenging conversations with caregivers, and ensure that children receive the appropriate interventions, resources, and support they require. Figure 1 depicts the process of implementing the ASQ, from staff training to conversations with caregivers to formal diagnosis to continual monitoring.

The systematic use of the ASQ in Montessori settings began as part of The ASQ Trailblazers Project launched by the Oregon Montessori Association (OMA) in 2019 to support Montessori educators wanting to (a) more accurately identify children at risk for developmental delays, (b) better support developmentally delayed students needing access to evaluation, and (c) be better prepared to have compassionate and meaningful

conversations with parents and caregivers about these challenges. In Oregon, Montessori programs participating in the Quality Rating and Improvement System (QRIS), also known as Spark, were encouraged to use the ASQ. However, the training and implementation guidelines they found available were mostly applicable to Early Head Start and Head Start models, and did not match the way Montessori programs functioned. Learning how to effectively use these tools and implement a developmental monitoring program—one that is compatible with both the Montessori pedagogy and the way Montessori programs work—has been a core goal of the project. Since its inception, more than 150 Montessori guides and administrators across Oregon and southern Washington have received training and support from ASQ trainer Avello-Vega, setting the foundation for this study.

The Need for This Study

Over the last several years, one of the largest Montessori associations in the United States, AMI/USA, repeatedly received inquiries from guides and parents regarding inclusive education. An influential Montessori leader directly asked in an email message:

> *I have been asked a few times about the [Montessori] Inclusion Course being offered again…. [It] was so well received. Do you know if there are any plans to offer it again? There is such a great need for this [type of] help for teachers.*
> *Thank you, Allyn Travis*
> (personal communication, March 24, 2023)

Additionally, during AMI/USA's annual conference—the 2024 Montessori Experience: Refresher Courses & More in Addison, Texas—nearly 25% of the approximately 1,000 registrants filled out a survey that included a question asking respondents to identify the top issues facing the Montessori community. Approximately 13% of respondents identified some version of "neurodiversity," "special education," or "inclusive education," which when combined into one category (inclusive education) was the most pressing topic.[1] This moved the AMI/USA leadership team to seek a host of interventions in an attempt to address this pressing need. One strategy was to establish a human rights and social

justice (HRSJ) committee, which established a group of advisors who quickly identified "inclusive education" as one of its top priorities. During a meeting of the HRSJ advisors, Montessori special educator Catherine Massie suggested that Avello-Vega be invited to talk about her groundbreaking work using a Montessori-adjusted early childhood developmental screener known as the Ages and Stages Questionnaires (ASQ). After Avello-Vega's presentation at an HRSJ committee meeting, committee members decided a formal study was needed on how the Montessori-adjusted ASQ training was received within the Montessori community.

Current Study

Although research confirms the positive benefits of developmental screeners (Bellman et al., 2013; Hirai et al., 2018), it is unclear how Montessori guides and administrators perceive the potential benefits and challenges associated with the ASQ implementation— a gap the present study aimed to fill. Specifically, this multimethod study aimed to assess the attitudes, beliefs, knowledge, skills, confidence, self-efficacy, and access to tools of Montessori guides and administrators before and after completing the *Use and Implementation of the Ages and Stages Questionnaires in a Montessori Setting* training. In addition, the study sought to explore the realities and needs of Montessori educators in supporting students who have disabilities, as well as ascertain the perceived benefits and challenges guides experienced in implementing the ASQ after being trained.

To inform the study, the following research questions were addressed: (1) *Do Montessori guides' and administrators' attitudes, beliefs, knowledge, skills, confidence, self-efficacy, and access to tools for supporting students with developmental disabilities or delays change before and after completing the ASQ in a Montessori Setting training?* (2) *Do the effects of participating in the ASQ training persist over time for trained alumni?* (3) *What are the realities and needs of Montessori guides and administrators for serving students with developmental disabilities or delays?* (4) *What are the perceived benefits and challenges of the implementation and use of the ASQ by Montessori community members?*

Methods

To address the research questions, the study featured a multimethod, pre/post design. The pre/post design was used to assess Montessori guide and administrator perceptions and experiences toward universal screenings, as well as gauge their experiences supporting students

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[1] "Family partnerships" was the second most pressing topic, and "racial equity" was the third.

who have developmental disabilities or delays, from before and after completing a Montessori ASQ training. The strengths of using both quantitative and qualitative methodologies are useful for drawing rich, contextual findings and conclusions (Creswell & Plano Clark, 2018). Quantitative methods included Likert-style, self-report response items on a pre-survey, post-survey, and post-only survey. The survey provided numerical scores of guides' and administrators' attitudes, beliefs, confidence, and perceived skills around identifying and supporting young students who have developmental delays or disabilities. The quantitative numerical scores were used to address the first and second research questions. It was hypothesized that participants in the ASQ training would have significantly higher scores on the outcomes of interest after completing the training compared to before. It was further hypothesized that the alumni of the ASQ training would have similar scores on the outcomes of interest compared to the recent completers of the ASQ training. In other words, it was hypothesized that the effects of participation in the program would be sustained over time for alumni.

Qualitative methods included open-ended survey questions and semi-structured focus groups with Montessori guides and administrators, addressing the third and fourth research questions, which explore perceptions around realities and needs for inclusive educational experiences for students as well as perceived benefits and challenges of using the ASQ. Since the third and fourth research questions were explored qualitatively, no hypotheses were generated.

Sample and Procedures
Pre/Post Survey

An online training, *Use and Implementation of the Ages and Stages Questionnaires in a Montessori Setting*, was conducted via Zoom across three Saturday mornings in January 2023. Approximately four to six weeks after the completion of the training, participants who completed the ASQ pre-survey and the training were emailed invites to complete the ASQ post-survey. For completing the training and ASQ pre- and post-surveys, each participant received a certificate of completion for professional development hours and a chance to win one of four $50 AMI/USA bookstore gift cards.

Montessori guides and administrators were invited to participate via email through the AMI/USA member LISTSERV, which was distributed to approximately 10,000 individuals. The aim was to recruit 100 guides and administrators to participate in the training. A total

of 127 Montessori guides and administrators completed a consent form and registered for the training to account for attrition. A total of 67 participants completed the ASQ pre-survey and training (Table 1). A majority of the ASQ pre-survey participants were female (94%) and had an average age of 44.7 ($SD = 10.4$). A total of 45 participants completed the ASQ post-survey (Table 1). A majority of the ASQ post-survey participants were female (91%) and had an average age of 47.1 ($SD = 7.78$).

Most participants were Montessori guides (52% pre-survey and 58% post-survey) or administrators (34% pre-survey and 42% post-survey). The average number of years participants had been educators was 18.6 ($SD = 10.6$). It was most common for participants to have never previously completed any specialized coursework besides a child development course (37%), whereas 22% had completed a specialized course in developmental delays or disabilities. Most participants worked at private Montessori schools (48%), and 4% of the schools were AMI/USA-recognized .

Post-only Survey

Montessori guides and administrators who were alumni of the *ASQ in a Montessori Setting* training, having completed the training prior to January 2023, were invited to participate in the post-only survey via email. Approximately 80 guides and administrators received the invitation to participate in the post-only survey. Each participant received a $5 gift card for completing the survey.

A total of 27 alumni participants completed the post-only survey (Table 1). A majority of the alumni participants were female (48%) and had an average age of 47.7 ($SD = 10.2$). A majority of the alumni participants were White (64%). Most alumni participants were administrators (59%) followed by guides (33%).

Focus Groups

Guides and administrators who participated in the training and surveys were invited to participate in the focus groups. Participation in the focus groups was low, therefore, an additional town-hall-style focus group was scheduled for guides and administrators invited through a member listserv. Participants received a $5 gift card for participating in a focus group.

A total of 20 guides and administrators participated in the focus groups. All participants were female (100%) and had an average age of 50.5 ($SD = 9.95$). A majority of focus group participants were White (55%). The average number of years of being an educator was 18.7 ($SD = 7.51$).

Table 1.

Survey Sample Demographics

	Pre-Survey		Post-Survey		Alumni Survey	
	N	%	N	%	N	%
Sex						
Male	3	4%	1	2%	0	0%
Female	63	94%	39	91%	13	48%
Race and Ethnicity						
White	41	61%	23	53%	9	33%
American Indian or Alaska Native	1	1%	1	2%	0	0%
Asian	5	7%	5	12%	9	33%
Black or African American	1	1%	0	0%	9	33%
Filipino	2	3%	1	2%	9	33%
Latinx or Hispanic	5	7%	3	7%	3	11%
Middle Eastern or North African	1	1%	0	0%	0	0%
More than one race or ethnicity	6	9%	3	7%	0	0%
Other	0	0%	2	5%	2	7%
Prefer not to disclose	5	7%	3	7%	1	4%
Number of Years as an Educator						
< 6 years	15	22%	5	12%	1	4%
6 - 15 years	19	28%	9	21%	3	11%
16 - 25 years	24	36%	19	44%	7	26%
> 25 years	8	12%	8	19%	3	11%
Educator Role						
Guide	35	52%	25	58%	9	33%
Administrator	23	34%	18	42%	16	59%
Other	1	1%	0	0%	2	7%
Prior Coursework						
No specialized coursework	10	15%	7	16%	3	11%
Only a child development course	13	19%	6	14%	4	15%
At least one specialized course	34	51%	27	63%	6	22%
Montessori Member						
Yes	30	45%	21	49%	6	22%
No	24	36%	19	44%	5	19%
Unsure	5	7%	3	7%	3	11%
School Type						
Private	51	76%	37	86%	13	48%
Public	2	3%	1	2%	1	4%
Other	6	9%	5	12%	0	0%
School Is AMI/USA Recognized						
Yes	28	42%	17	40%	1	4%
No	25	37%	21	49%	13	48%
Unsure	6	9%	5	12%	0	0%

Most participants had previously completed a specialized course in developmental delays or disabilities (65%), whereas 35% had never completed any specialized coursework besides a child development course.

Measures

Survey

The researcher developed the self-report survey—for the pre-survey, post-survey, and post-only survey—to measure participants' attitudes and beliefs, knowledge and skills, confidence and self-efficacy, and access to requisite tools and resources to use universal screeners to support students with developmental disabilities or delays. An example item that measured attitudes and beliefs was, "Using [a developmental screener] is essential for the detection and development of developmental delays in young children." An example item that measured knowledge and skills was, "I have the knowledge I need to be able to detect developmental delays within all my students." An example item that measured confidence and self-efficacy was, "I believe I can always identify difficult-to-detect developmental delays in all my students." An example item that measured access to tools and resources was, "I have the tools I need to provide appropriate interventions for my students in need." All items were presented randomly in a Likert-style format for participants to rate their level of agreement from 1 (strongly disagree) to 7 (strongly agree).

Demographic and background information, such as the number of years being a Montessori educator, were also collected. In addition, several open-ended items were included to assess the benefits and challenges of implementing the ASQ.

Focus Group Protocol

The researcher developed a semi-structured focus group protocol. The focus group questions invited participants to reflect on their attitudes toward universal screeners, how their experiences supporting students who have developmental disabilities or delays had changed since completing the ASQ training, and any benefits or challenges of implementing the ASQ in their respective school settings.

Analysis

To address the first and second research questions, which are related to participants' attitudes, beliefs, knowledge, skills, confidence, self-efficacy, and access to tools for supporting students with developmental disabilities or delays, survey items were grouped into a series of corresponding subscales: attitudes and beliefs, perceived knowledge and skills, confidence and self-efficacy, access to resources and tools around universal screeners, and identifying and supporting students with developmental delays or disabilities. Cronbach's Alpha tests of reliability were calculated for the pre-survey, post-survey, and post-only survey for each subscale and demonstrated high reliability (see Appendix). To answer the first research question, a series of repeated measures t-tests were conducted to analyze the differences between ASQ training participants' pre- and post-training scores for each subscale. To answer the second research question, a series of independent sample t-tests were conducted to analyze differences between ASQ post-survey participants' (recent completers) scores and alumni participants' scores on each subscale.

To address the third and fourth research questions, a conventional thematic analysis approach (Hsieh & Shannon, 2005) was conducted with the open-ended survey items from the post-only survey, along with guide and administrator focus group responses. The final set of codes was developed through an iterative process of creating and combining codes through multiple rounds of reviewing and coding the qualitative data.

Results

Results and findings are categorized by the research questions. Descriptive statistics from the self-report surveys (items and subscales) are provided in Table 2, to address the first research question: *Do Montessori guides' and administrators' attitudes, beliefs, knowledge, skills, confidence, self-efficacy, and access to tools for supporting students with developmental disabilities or delays change before and after completing the ASQ in a Montessori Setting training*? Results from the pre/post survey analyses (Table 2 and Table 3) indicate that guides and administrators were significantly more likely to recognize the benefits of using a universal screener after completing the ASQ training ($M = 5.89$, $SD = 1.05$) compared to before the training ($M = 5.20$, $SD = .93$, $p < 0.01$). Similarly, guides and administrators were significantly more likely to self-rate their skills and knowledge as higher after completing the ASQ training ($M = 5.45$, $SD = .90$) than before the training ($M = 4.42$, $SD = 1.30$, $p < 0.001$). Results also indicate that guides and administrators were significantly more likely to self-rate their confidence and self-efficacy as higher after completing the ASQ training ($M = 4.52$, $SD = 1.25$) than before the training ($M = 3.64$, $SD = 1.46$, $p < 0.001$). Finally, results indicate that guides and

Table 2
Descriptive Statistics for Survey Responses

	ASQ Pre-Survey			ASQ Post-Survey			ASQ Alumni Survey		
	N	*M*	*SD*	*N*	*M*	*SD*	*N*	*M*	*SD*
Attitudes and Beliefs	49	5.20	0.93	41	5.89	1.05	14	6.05	0.58
Using [a developmental screener] is essential for the detection of developmental delays in young children	50	5.14	1.39	41	5.90	1.30	15	5.47	1.55
[Developmental screeners] should be a requirement in early childhood school settings	49	5.43	1.49	42	6.02	1.37	14	6.29	1.54
[Developmental screeners] are a waste of resources (reverse scored)	54	1.78	1.24	42	1.74	1.62	15	1.40	1.06
[Developmental screeners] are effective at detecting students' developmental delays	52	4.87	1.22	42	5.90	1.30	15	5.93	1.16
Using [developmental screeners] leads to harmful labeling of students (reverse scored)	53	2.32	1.22	42	1.95	1.51	15	1.60	1.12
[Developmental screeners] ensure more students get the support that they need	50	4.92	1.61	42	6.14	1.00	15	5.93	1.22
[Developmental screeners] ensure equitable access to developmental resources	51	4.61	1.69	42	5.38	1.72	15	5.33	1.45
[Developmental screeners] are useful for having conversations with caregivers about their child's developmental delays	49	5.78	1.30	41	6.24	1.22	15	6.80	0.41
Skills and Knowledge	62	4.42	1.30	44	5.45	0.90	14	5.81	0.95
I know what universal developmental screening is	63	4.33	1.85	44	6.34	1.03	14	6.43	0.85
I can digest technical information (e.g., research articles) about child development outside of the Montessori context	63	5.21	1.44	44	5.57	1.25	14	6.07	1.07
I regularly use my skills to talk to caregivers about their child's developmental delays	63	4.22	1.68	44	5.14	1.32	14	5.86	1.35
I have a strong understanding of the types of developmental delays that can exist for children	63	4.29	1.56	44	5.27	1.09	14	5.36	1.45
I have the knowledge I need to be able to detect developmental delays within all my students	63	3.48	1.58	44	4.73	1.30	14	5.50	1.40
I have the skills I need to talk to caregivers about their child's developmental delays	63	4.13	1.61	44	5.34	0.99	14	5.79	0.97
I can explain to others the types of developmental delays that can exist for children	62	4.08	1.56	44	5.18	1.19	14	5.50	1.45
I regularly apply my knowledge to detect developmental delays within all my students	62	4.23	1.56	44	5.11	1.37	14	6.00	1.36

	N	M	SD	N	M	SD	N	M	SD
Confidence and Self-efficacy	62	3.64	1.46	43	4.52	1.25	16	4.59	1.12
I feel I can always identify all of the students in my school setting who have developmental delays	62	3.58	1.89	43	4.28	1.62	16	4.69	1.49
I am always confident in my ability to have conversations with caregivers about their child's developmental delays	62	3.71	1.76	43	4.67	1.34	16	5.06	1.29
I feel I can effectively support the needs of all my students who have developmental delays	63	3.32	1.61	43	4.35	1.46	16	4.13	1.50
I am confident I can appropriately refer all my students who may be in need of a disability diagnoses	62	3.84	1.67	43	5.09	1.54	16	5.06	1.61
I believe I can always identify difficult-to-detect developmental delays in all my students	62	2.79	1.74	43	3.74	1.54	16	4.00	1.26
Tools and Resources	62	4.21	1.18	43	4.92	1.08	16	5.22	0.84
I have a clear process for having conversations with caregivers about their child's developmental delays	62	3.68	1.60	43	5.12	1.24	16	5.13	1.41
I have the tools I need to provide appropriate interventions for students in need	62	3.34	1.33	43	4.33	1.51	16	4.25	1.81
I am supported by my colleagues in helping my students with developmental delays	62	4.87	1.50	43	5.21	1.21	16	5.75	1.39
I know the appropriate next steps to take after detecting developmental delays within my students	62	4.05	1.65	43	5.47	1.33	16	5.81	1.17
My school administration supports me in helping my students with developmental delays	62	4.77	1.68	43	5.16	1.51	16	6.06	1.12
I feel supported by Montessori leadership in helping my students with developmental delays	63	3.97	1.69	43	4.21	1.67	16	4.31	1.62

administrators were significantly more likely to report their access to resources and support as higher after completing the ASQ training ($M = 4.92$, $SD = 1.08$) than before the training ($M = 4.21$, $SD = 1.18$, $p < 0.001$).

Results addressing the second research question—*Do the effects of participating in the ASQ training persist over time?*—are presented in Table 2 and Table 4. Alumni of the training had significantly higher skills and knowledge ($M = 5.81$, $SD = .95$, $p < 0.05$) and significantly greater access to tools and resources ($M = 5.22$, $SD = .84$, $p < 0.05$) than guides and administrators who recently completed the training (skills and knowledge $M = 5.45$, $SD = .90$; access to tools and resources $M = 4.92$, $SD = 1.08$). No significant differences are shown between the recent completers ($M = 5.89$, $SD = 1.05$) and the alumni group ($M = 6.05$, $SD = .58$, $p = 0.428$) concerning attitudes and beliefs toward universal screeners. No significant differences are shown between the recent completers ($M = 4.52$, $SD = 1.25$) and the alumni group ($M = 4.59$, $SD = 1.12$, $p = 0.328$) for confidence and self-efficacy.

The next set of findings addresses the third research question: *What are the realities and needs of Montessori guides and administrators for serving students with developmental disabilities or delays?* The study results offer valuable insights into the realities and needs of Montessori educators (Figure 2 and Figure 3). According to participants in the study, the increasing number of special needs students requiring additional support has created a pressing demand for effective solutions.

Table 3.
Paired Sample T-Test Results of Guide and Administrator Scores Regarding Universal Screeners and Supporting Students with Developmental Disabilities or Delays

	N	Pre-Survey Mean Score	Post-Survey Mean Score	Difference Score	SD	t (df)	p
Attitudes and Beliefs	29	5.20	5.89	0.69	1.32	2.80 (28)**	0.009
Skills and Knowledge	38	4.42	5.45	1.03	0.77	8.28 (37)***	<.001
Confidence and Self-efficacy	39	3.64	4.52	0.88	1.25	4.42 (38)***	<.001
Tools and Resources	39	4.21	4.92	0.71	0.89	4.96 (38)***	<.001

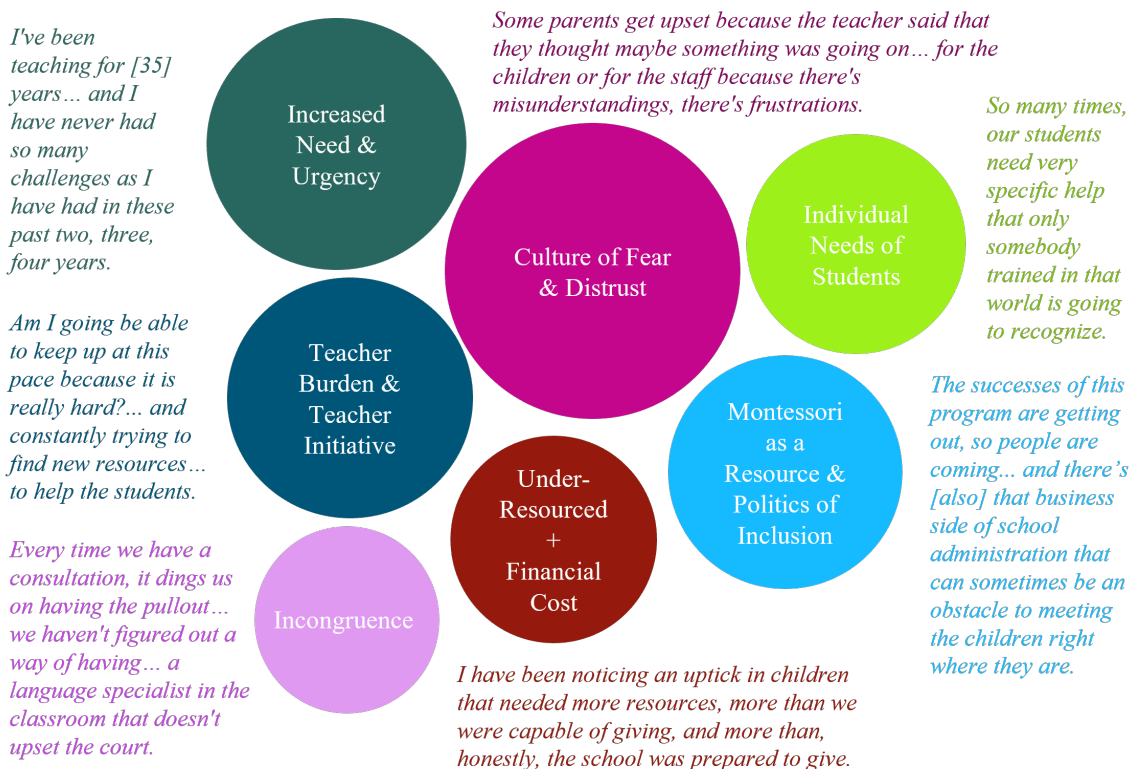Note: * $p < .05$, ** $p < .01$, *** $p < .001$

Table 4
Independent Sample T-Test Results of Recent Completer and Alumni Scores Regarding Universal Screeners and Supporting Students with Developmental Disabilities or Delays

	N	Post-Survey Mean Score	Alumni Survey Mean Score	Difference Score	SD	t (df)	p
Attitudes and Beliefs	29	5.89	6.05	0.69	1.32	2.80 (28)**	0.009
Skills & Knowledge	38	5.45	5.81	1.03	0.77	8.28 (37)***	<.001
Confidence & Self-efficacy	39	4.52	4.59	0.88	1.25	4.42 (38)***	<.001
Tools & Resources	39	4.92	5.22	0.71	0.89	4.96 (38)***	<.001

Note: * $p < .05$, ** $p < .01$, *** $p < .001$

Figure 2.
Reported Realities of Montessori Guides and Administrators

I've been teaching for [35] years… and I have never had so many challenges as I have had in these past two, three, four years.

Am I going be able to keep up at this pace because it is really hard?... and constantly trying to find new resources… to help the students.

Every time we have a consultation, it dings us on having the pullout… we haven't figured out a way of having… a language specialist in the classroom that doesn't upset the court.

Some parents get upset because the teacher said that they thought maybe something was going on… for the children or for the staff because there's misunderstandings, there's frustrations.

So many times, our students need very specific help that only somebody trained in that world is going to recognize.

The successes of this program are getting out, so people are coming... and there's [also] that business side of school administration that can sometimes be an obstacle to meeting the children right where they are.

I have been noticing an uptick in children that needed more resources, more than we were capable of giving, and more than, honestly, the school was prepared to give.

Increased Need & Urgency

Culture of Fear & Distrust

Individual Needs of Students

Teacher Burden & Teacher Initiative

Montessori as a Resource & Politics of Inclusion

Under-Resourced + Financial Cost

Incongruence

Note: *In the figure, larger circles represent more frequently reported themes while smaller circles represent less frequently reported themes.*

Figure 3
Reported Needs of Montessori Guides and Administrators

We appreciate that we always have more to learn [about] how we can… educate ourselves and understand the child better. So definitely more educating across the board.

Training & Professional Development

Adaptability & Alignment

I appreciate where AMI is coming from and there are certain core tenets that we have to stick to but also the world is changing and we have to have more tools to help us.

One of the big things I'm hoping for is to create and be a part of more of a community that's sharing these things.

Community & Support Groups

Additional Resources & Support

We could always use more help… I think having somebody on staff who is dedicated to being that support person.

Note: *In the figure, larger circles represent more frequently reported themes while smaller circles represent less frequently reported themes.*
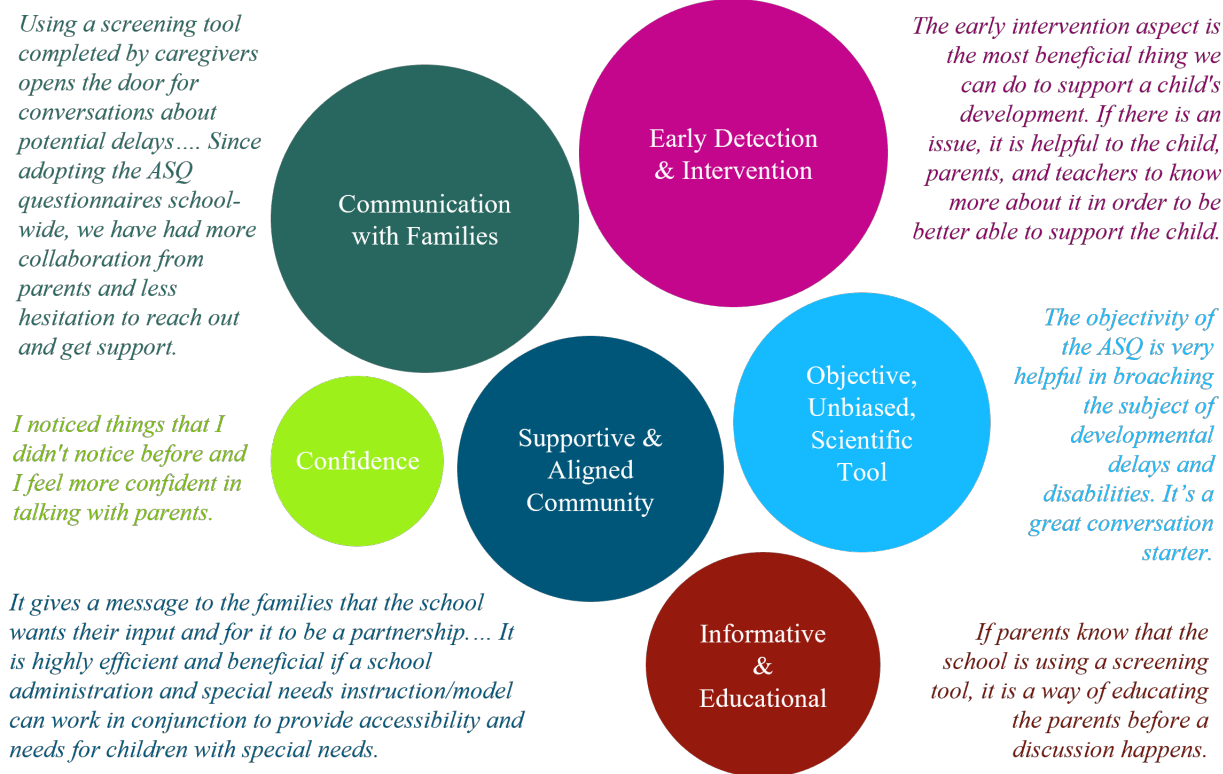
However, the availability and accessibility of resources have struggled to keep pace with these growing needs, putting pressure on policies, finances, and staffing.

In this study, we found that Montessori guides often perceived themselves as bearing the weight of supporting these students, especially in under-resourced schools. This led to concerns about providing adequate assistance or having access to sufficient training. Furthermore, there is a lingering fear of blame and mistrust, likely a historical relic from past challenges, that can permeate groups involved in supporting students who have developmental disabilities or delays. For instance, participating guides and administrators described being worried that caregivers would blame school staff for relaying to parents that their child might have developmental delays. On the other hand, participants were also aware that children's parents and other caregivers, too, feared being blamed. For example, some caregivers fear that in advocating for their children they might be seen as "problems" by teachers. Caregivers may also worry about students being "advised out" of their school by administration citing that the school lacks necessary resources to support their child. Importantly, according to study participants, all members of the community had the potential to be givers or receivers of blame or mistrust.

Despite these challenges, the study shows the incredible dedication of Montessori guides. Most took personal initiatives to seek out additional resources, training, and support. They expressed a profound moral obligation to identify each student's unique needs and tailor the classroom experience accordingly. For example, one guide in the study reported, "I have to educate myself. It's only the right thing to do for them and for me because it's so frustrating when I see a child is struggling and I have no idea what to do or where that struggle came from." Early detection was also seen as key. When a screener is applied universally, it helps avoid picking out and labeling children with concerning behavior: "I believe a schoolwide program normalizes the screening process since it would be done by all families. It reaffirms to caregivers the school's awareness of child development milestones and the importance of early intervention."

Themes around the specific needs of guides and administrators were also identified (Figure 3). There was a clear call for more specialized training and ongoing professional development to effectively support and manage students who have special needs. This is illustrated in the following quote from a guide who participated in the study: "There needs to be an overall retraining. [We] can't just say okay, what you learned

Figure 4
Reported Benefits of Implementing and Using the ASQ

Using a screening tool completed by caregivers opens the door for conversations about potential delays…. Since adopting the ASQ questionnaires school-wide, we have had more collaboration from parents and less hesitation to reach out and get support.

Communication with Families

Early Detection & Intervention

The early intervention aspect is the most beneficial thing we can do to support a child's development. If there is an issue, it is helpful to the child, parents, and teachers to know more about it in order to be better able to support the child.

I noticed things that I didn't notice before and I feel more confident in talking with parents.

Confidence

Supportive & Aligned Community

Objective, Unbiased, Scientific Tool

The objectivity of the ASQ is very helpful in broaching the subject of developmental delays and disabilities. It's a great conversation starter.

It gives a message to the families that the school wants their input and for it to be a partnership…. It is highly efficient and beneficial if a school administration and special needs instruction/model can work in conjunction to provide accessibility and needs for children with special needs.

Informative & Educational

If parents know that the school is using a screening tool, it is a way of educating the parents before a discussion happens.

Note: *In the figure, larger circles represent more frequently reported themes while smaller circles represent less frequently reported themes.*
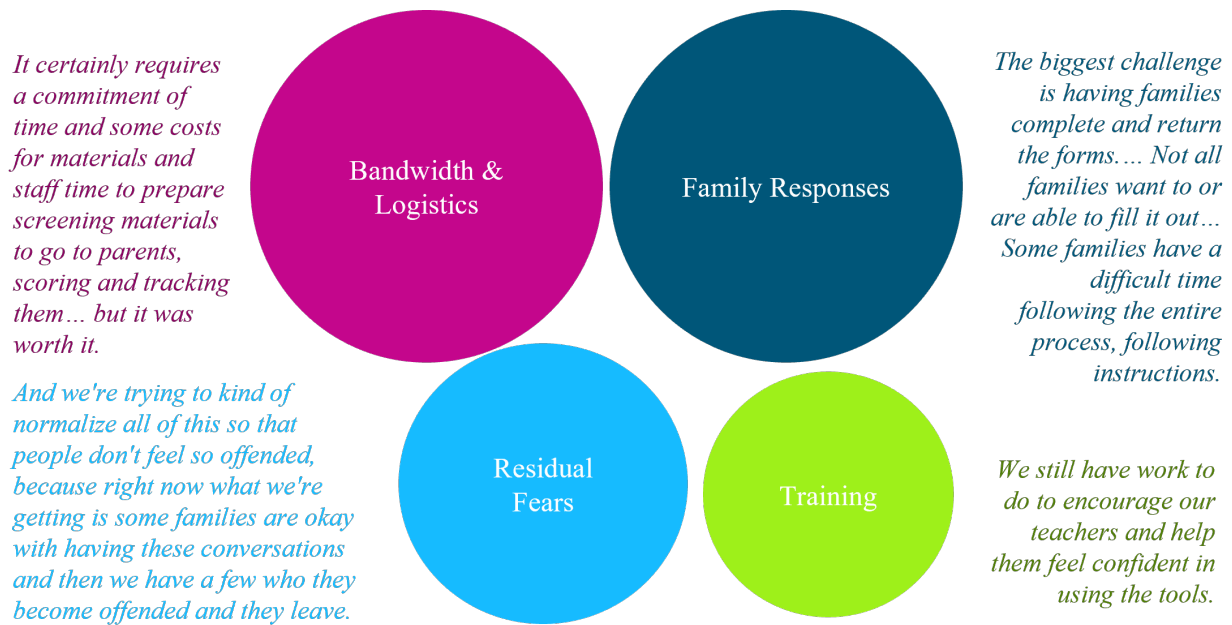
20 years [ago] is still going on today." Participants stressed the importance of keeping up to date with evidence-based strategies and the need for more adaptable, flexible, and aligned systems within the Montessori framework to cater to all types of learners. While the Montessori approach and training are highly regarded for their value in individualizing instruction, some participants felt strict standards and practices could sometimes act as barriers to providing necessary support for students who have special needs.

Establishing trust-based relationships with service providers and involving Montessori trainers in understanding current needs were seen as crucial steps. A strong emphasis was also placed on the importance of specialized staff dedicated to supporting students who have special needs, as well as the value of forming support groups and providing opportunities for guides to connect and learn from one another. A community-based approach, involving all members and distributing the workload, can be a particularly effective solution for schools that do not have the resources to hire a full-time

specialized staffer. As one administrator noted, "[We need] staff training, collaboration, changes in school policies, having people partner to accomplish change and implement [a] call to action."

The final set of themes was identified with respect to the fourth research question: *What are the perceived benefits and challenges of the implementation and use of the ASQ by Montessori community members?* Thematic analyses reveal that participants viewed the ASQ training and tool as highly beneficial (Figure 4). The training boosted participants' confidence and self-efficacy, empowering them to more effectively support students. For example, one guide reported, "Our confidence level is greater, and the fact that…the staff, the teachers, the primary and toddler teachers are just discussing a lot more and talking about ways that we are refining our resource list and referral list." Furthermore, the training enabled early detection and facilitated communication with parents and caregivers. Study participants considered the ASQ a reliable and externally validated tool that normalized the screening process to provide

Figure 5
Reported Challenges of Implementing and Using the ASQ

It certainly requires a commitment of time and some costs for materials and staff time to prepare screening materials to go to parents, scoring and tracking them… but it was worth it.

Bandwidth & Logistics

Family Responses

The biggest challenge is having families complete and return the forms.… Not all families want to or are able to fill it out… Some families have a difficult time following the entire process, following instructions.

And we're trying to kind of normalize all of this so that people don't feel so offended, because right now what we're getting is some families are okay with having these conversations and then we have a few who they become offended and they leave.

Residual Fears

Training

We still have work to do to encourage our teachers and help them feel confident in using the tools.

Note: *In the figure, larger circles represent more frequently reported themes while smaller circles represent less frequently reported themes.*

valuable information and resources for guides, parents, and families. This is illustrated in the following quote from a guide who participated in the study: "[The] ability to screen all children with a consistent set of benchmarks across developmental domains. [It] avoids any feelings a parent might have that their child is being unfairly singled out, because everyone is being screened."

On the other hand, thematic analyses also reveal challenges in implementing the ASQ (Figure 5). Challenges included concerns about bandwidth and logistics, families' resistance to change, and the need for buy-in and training among colleagues. To address these challenges and ensure successful implementation, participants stressed the importance of creating seamless support systems and fostering collaboration within the school community. Overall, Montessori guides and administrators perceived the ASQ as a valuable tool for detecting and supporting students who have developmental delays or disabilities.

Discussion

This study explores the realities and needs of Montessori educators who aim to support students who have special needs. It further explores the perceptions of, and associated benefits and challenges for, Montessori educators using the ASQ before and after completing

a specialized Montessori-centered ASQ training. The results suggest that the ASQ training and tool were perceived as beneficial and valuable. The training positively influenced participants' attitudes, beliefs, skills, knowledge, confidence, self-efficacy, and access to resources. In addition, the effects of the training were sustained over time for alumni concerning their attitudes and beliefs, as well as confidence and self-efficacy, in using universal screeners. Importantly, research suggests educators' positive attitudes and beliefs around supporting students who have disabilities are essential for effective inclusive teaching practices (Jordan et al., 2009). This study also provides preliminary evidence that positive effects of training as related to Montessori educators' skills and knowledge, as well as access to tools and resources training, may increase over time. This is a substantial finding, given that participating in teacher special education training does not always guarantee satisfactory preparation (Forlin & Chambers, 2011).

Qualitative findings suggest that addressing challenges and needs identified around supporting students who have disabilities, and implementing the ASQ, are crucial for creating more inclusive classrooms. Findings further include the establishment of a culture of trust, provision of specialized training and support, alignment of systems and resources, integration within

Table 5
Recommendations by Stakeholder

Guides	• Have conversations with school personnel and parents/families about students who may need special support early and often. • Develop a plan of support for students with special needs with administration, specialized staff, parents, and available resources. • Establish trusting relationships with service providers to ensure coordinated support for students with special needs.
Administrators	• Provide additional and ongoing specialized training and professional development opportunities for guides and administrators to effectively support and manage students with special needs. • Sustain the positive effects of the ASQ training over time by providing ongoing support and reinforcement. • Foster a culture of trust and collaboration among guides, administrators, and parents to promote transparent communication and collaboration. • Work to align systems and resources to support all types of learners, including students with special needs. • Establish specialized professional staff positions, such as directors of inclusion or school-wide occupational therapists, dedicated to supporting students with special needs; or implement a community-based approach that distributes the workload and involves all stakeholders in supporting students with developmental disabilities or delays.
Trainers	• Ensure that training programs are responsive to the current needs and realities and include training on evidence-based strategies for supporting neurodivergent students and those with developmental disabilities or delays.
Leaders and Policy Makers	• Provide adaptable, flexible, and aligned systems within the Montessori framework, policies, and practice standards to support all types of learners, including students with special needs wherever possible. • Work closely with recognition organizations to promote inclusive practices (e.g., make universal screening a requirement or recommendation alongside recognition). By aligning policies and practices, schools can enhance the credibility and consistency of their inclusive policies. • Involve Montessori trainers in understanding the present needs of educators and aligning requirements and policies accordingly. • Create specialized support groups and opportunities for guides and school personnel to connect and learn from each other.

the Montessori framework, and implementation of universal screening tools such as the ASQ. To address issues identified in this study, a set of practice and policy recommendations were developed (Table 5). Importantly, while findings from this study suggest that participating in the ASQ training in a Montessori setting is beneficial, truly inclusive education requires a coordinated team. This includes highly trained specialists with expertise in developmental disabilities (Mastropieri et al., 2011). In addition, the ASQ is but one important tool, and to facilitate inclusive education practices, Montessori educators may also benefit from a deeper dive into developmental disabilities in their teacher preparation courses, as is supported in the literature (Zagona et al., 2017).

The first step in serving children with developmental and learning difficulties is to identify as accurately as possible *who* these children are and *with what obstacles* they may be struggling. It is well established in the developmental sciences that early intervention is more effective and more efficient for supporting children who need interventions and therapies in reaching their growth potentialities (Hirai et al., 2018; National Center for Learning Disabilities, 2020). Developmental screening tools, such as the ASQ, are widely accepted as valid and reliable for tracking developmental trajectories and flagging discrepancies that are worth investigating or giving a little extra attention and observation (Bricker et al., 2010; Macy, 2012; McCrae & Brown, 2018).

Montessorians are keenly aware of the need for and value of early intervention—or as they commonly say, "early aid to life." Maria Montessori was perhaps the earliest and most vocal advocate for early intervention. Her groundbreaking theory of the four planes of development expounds a uniquely vital role of the first plane of development—the plane of the absorbent mind and its sensitive period of development. During this period, intervention is vastly more effective because of the natural developmental processes taking place and general neuroplasticity. Montessori explains what happens when developmental deviations are not identified early: "Many defects which became permanent, such as speech defects, the child acquires through being neglected during the most important period of his age, the period between three and six, at which time he forms and establishes his principal functions" (Montessori, 1912, p. 34). She also advocates for early identification and intervention:

> *If for the attention which we paid to the correction of linguistic defects in children in the upper grades we would substitute a direct direction of the development of the language while the child is still young our results would be much more practical and valuable. (Montessori, 1912, p. 228)*

The value of the ASQ training to Montessori educators is evidenced from this study. Through professional development tailored to Montessorians and high-fidelity implementation of the ASQ tool, Montessori guides can refine their observations of the unfolding development of each student and confidently advocate for individual needs of each and every child. Universal screening can lay a foundation in Montessori education to fulfill Montessori's plea that we do not "neglect" a child's developmental need for aid to life during the first plane—the *best* plane for effective interventions.

We have discussed the practical issues of inclusive education and now turn to implications for research. Future research considerations include replicating this study with a larger diverse sample. Future research may also consider more deeply exploring the relationship between guide and caregiver in Montessori settings, given the importance of a sympathetic and constructive relationship in supporting students who have special needs (Sucuoğlu & Bakkaloğlu, 2018). Additionally, research demonstrates the challenges of preparing adults for inclusive classrooms (Forlin & Chambers, 2011). Specific training, and keeping up with the current

science of learning and development of students who have disabilities, is critical to supporting these students and their families (Creemers et al., 2012; Zagona et al., 2017). Little research exists on the current preparation practices of the Montessori guide. Therefore, an empirical examination of the preparation of the Montessori teacher may be a worthwhile endeavor.

In conclusion, as Montessori schools aim to become more inclusive, Montessori educators can be better prepared to serve children with more diverse needs by having the necessary tools and training. By doing so, Montessori educators can confidently collaborate with families and school staff to identify, support, and advocate for each child's individual needs. This is the path to successful and joyful Montessori inclusion *where every child can belong.* This study provides evidence that Montessori educators benefit from the ASQ developmental screening training. Through training and consistent implementation of the ASQ, Montessori educators can gain a better understanding of developmental milestones, more effectively observe their students, and more confidently advocate for students' support needs.

Contributors

AS initiated and conceived the project. AS, EP, DAV, and CM designed and operationalized the project. EP conducted the research study from start to finish. DAV developed and offered the online ASQ training. CM and a team of assistants supported the online training. EP conducted the literature review. AS, CM, and DAV identified relevant grey literature. EP conducted data collection and data analysis. All authors supported the interpretation of the findings and drafted the manuscript. All authors reviewed the study findings, critically revised the manuscript at all stages, and approved the final version before submission.

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Appendix
Cronbach Alpha Scores by Scale

To what extent do you disagree or agree with the following statements about universal developmental screening tools?		Cronbach's Alpha Pre-Survey	Cronbach's Alpha Post-Survey
Using them is essential for the detection of developmental delays in young children			
They should be a requirement in early childhood school settings			
They are a waste of resources (reverse scored)			
They are effective at detecting students' developmental delays	Attitudes and Beliefs	0.807	0.890
Using them leads to harmful labeling of students (reverse scored)			
They ensure more students get the support that they need			
They ensure equitable access to developmental resources			
They are useful for having conversations with caregivers about their child's developmental delays			
I know what universal developmental screening is			
I can digest technical information (e.g., research articles) about child development outside of the Montessori context			
I regularly use my skills to talk to caregivers about their child's developmental delays			
I have a strong understanding of the types of developmental delays that can exist for children			
I have the knowledge I need to be able to detect developmental delays within all my students	Skills and Knowledge	0.903	0.888
I have the skills I need to talk to caregivers about their child's developmental delays			
I can explain to others the types of developmental delays that can exist for children			
I regularly apply my knowledge to detect developmental delays within all my students			
I feel I can always identify all of the students in my school setting who have developmental delays			
I am always confident in my ability to have conversations with caregivers about their child's developmental delays			
I feel I can effectively support the needs of all my students who have developmental delays	Confidence and Self-efficacy	0.880	0.886
I am confident I can appropriately refer all my students who may be in need of a disability diagnoses			
I believe I can always identify difficult-to-detect developmental delays in my students			

I have a clear process for having conversations with caregivers about their child's developmental delays			
I have the tools I need to provide appropriate interventions for my students in need			
I am supported by my colleagues in helping my students with developmental delays	Tools and Resources	0.830	0.853
I know the appropriate next steps to take after detecting developmental delays within my students			
My school administration supports me in helping my students with developmental delays			
I feel supported by Montessori leadership in helping my students with developmental delays			

Note: *The stem for the survey was, "To what extent do you disagree or agree with the following statements about universal developmental screening tools?"*