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Disseminating Information on Evidence-Based Practices for Children and Youth with Autism Spectrum Disorder: AFIRM

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Abstract
Comprehensive reviews of the research literature have identified that focused intervention practices for children and youth with autism spectrum disorder have evidence of producing positive developmental and learning outcomes. The Autism Focused Intervention Resources and Modules (AFIRM) project has translated evidence-based practices identified by Wong et al. (Journal of Autism and Developmental Disorders 45(7):1951–1966, 2015) into online learning modules. The purpose of this paper is to describe (1) the process for translating the research literature into practical information that practitioners can use, (2) its dissemination through a freely accessible website, (3) the use of the modules by over 64,500 users located in the United States and abroad, (4) knowledge gained as a result of completing the modules, and (5) consumers' evaluations of modules usefulness and relevance.

Keywords Evidence-based practice · Autism Spectrum Disorder · Children · Youth

There is now great demand for knowledge about intervention practices that work. This demand is pushed by the increased prevalence of autism spectrum disorder (ASD; Baio et al. 2018), recognition that ASD is a condition that has substantial life-long implications (Howlin and Magiati 2017), and evidence that children, youth, and adults with ASD benefit from intervention and instruction programs (Wong et al. 2015). Yet, just knowing which practices are effective and are supported by research is not enough to lead to increased use of such practices. Implementation and diffusion sciences both emphasize the need to translate such scientifically-based information into practical information that service providers can use in their work with children and youth with ASD and their families (Dingfelder and Mandell 2011; Fixsen et al. 2013). The purpose of this paper is to describe one approach that translated information about evidence-based practices into practical information for use in programs for children and youth with ASD, report the utilization of such a dissemination effort by consumers, and examine the evaluation of such information by consumers.

In the mid-2000s, two groups of researchers, the National Standards Project (NSP; National Autism Center 2009) and the National Professional Development Center on Autism Spectrum Disorder (NPDC; Odom et al. 2010) conducted parallel comprehensive and systematic reviews of the autism intervention literature and then updated these reviews 5–6 years later (National Autism Center 2015; Wong et al. 2015) Both projects utilized systematic and rigorous criteria for evaluating the research (i.e., methodological acceptability of each study found) and a national (i.e., from the United States) set of trained reviewers. In these second reviews, the NSP identified 14 practices as *Established*, 18 practices as *Emerging*, and 13 practices as *Unestablished* (National Autism Center 2015). The NPDC identified 27 evidence-based practices (EBPs; Wong et al. 2014, 2015). Researchers compared the studies identified in the second reviews, finding substantial agreement between the two reviews (NPDC 2017a, b; see https://autismpdc.fpg.unc.edu/evidence-based-practices). Also, it should be noted that other researchers at that time conducted systematic reviews of individual practices (e.g., Reichow et al. 2013), but none conducted comprehensive reviews of the variety of behavioral and developmental intervention practices in the literature for children and youth with ASD (i.e., ages infancy to 22 years).

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The NPDC and NSP reviews included focused intervention practices and not comprehensive treatment programs (CTMs). A *focused intervention practice* is a procedure or set of procedures that service and care providers use to produce specific behavioral and developmental outcomes for infants, children, and youth with ASD (Odom et al. 2010). Examples of focused intervention practices are prompting, time delay, visual supports, and social narratives. In contrast, a CTM is a set of practices that follow a conceptual framework and are implemented over a lengthy period of time (e.g., 1–2 years or more) (Odom et al. 2010). CTMs have a broad impact on core features of ASD and/or associated learning needs by using multiple practices to target skills across multiple domains (e.g., social communication, repetitive behavior). Examples of CTMs are the UCLA Early Autism Project (i.e., now the Lovaas model), Early Start Denver Model, and the Princeton Child Development Center Model. The dissemination program described in this paper encompasses only focused intervention practices.

Although substantial research literature exists that could inform intervention practice, a significant gap exists between current knowledge about EBPs and their routine use by practitioners (Parson et al. 2013). Authors have noted that in community-based programs, EBPs are not routinely employed (Dingfielder and Mandell 2011; Hess et al. 2008). There has been, however, emerging efforts to support the use of EBPs in practice. Models based on diffusion science (Dingfielder and Mandell 2011) and implementation science (Odom et al. 2013) have the promise of moving research into practice more rapidly. The implementation science model proposes a stage-based, systems approach to introduce EBPs and support initial exploration to adoption and use of EBPs by practitioners and educators through a set of guiding steps (Aarons et al. 2011; Fixen et al. 2013).

One essential step in the implementation process is to "translate" research-based practices into a form that is accessible, feasible, and acceptable for practitioners (Dingfielder and Mandell 2011; Fixsen et al. 2013). As noted previously, the purpose of this paper is to describe (1) a project, Autism Focused Intervention Resources and Modules (AFIRM 2018), which disseminates information about a peer-reviewed set of EBPs (Wong et al. 2014, 2015), (2) the use of this dissemination resource by practitioners and educators in the United States and other countries, and (3) the evaluation of information provided by users of the disseminated resource. The specific questions addressed in this paper are:

1. Who is using the AFIRM modules and resources?
2. How do users interact with features of the AFIRM website (i.e., downloadable materials, page views, session lengths, and certificates awarded)?
3. What knowledge gains did AFIRM users demonstrate?
4. What are the users' evaluations of the usefulness, relevance, and quality of the information provided in each module?

Method

The AFIRM project began with the review conducted by NPDC to identify EBPs for children and youth with ASD (Wong et al. 2014, 2015). Details about the EBP selection process appears in the original report (Wong et al. 2014) and subsequent journal publication (Wong et al. 2015).

Online Module Development

The AFIRM team utilized the Instructional Design Model developed by Kemp and colleagues (Morrison et al. 2010). The Kemp model, typically used for technology-based instructional programs and adult students, consists of a set of learner-centered components that guided module development. To ensure delivery in short and manageable sections with clear instructions, content for the AFIRM modules is sequenced. To meet the needs of busy practitioners and educators, instructional strategies (i.e., engaging examples, activities, and downloadable resources) are embedded. Each module includes evaluation instruments and check-ins to assess content knowledge, quality, relevancy, and usefulness of the AFIRM module. The module developers had training at the doctoral level in special education, clinical psychology, or a related discipline and expertise in the content of the module as it applied to children and youth with ASD. In addition, experts in the field (i.e., often individuals who had published studies about the practice in the EBP review by Wong et al. 2015) reviewed the finished draft of newly identified EBP modules.

Each AFIRM module follows the same learning structure consisting of four lessons (see Fig. 1). Lesson 1 provides a definition and description of the practice, information on how the practice is used and by whom, and an overview of the research basis for the practice (i.e., evidence-base). Lesson 2 delivers information on planning for the practice, concrete examples of how to follow the EBP implementation steps, and activities, videos, and resources needed for planning. Lesson 3 details how users can use the EBP by providing step-by-step instructions, examples, and interactive problem-solving activities. Finally, Lesson 4 focuses on steps for monitoring the practice, examples of how to use data to make decisions, and downloadable sample data forms. The consistency of the structure across all modules allows users to find information and resources to meet their unique needs.

To assist practitioners with selecting a specific EBP (from the 27) to use with an individual student with ASD,
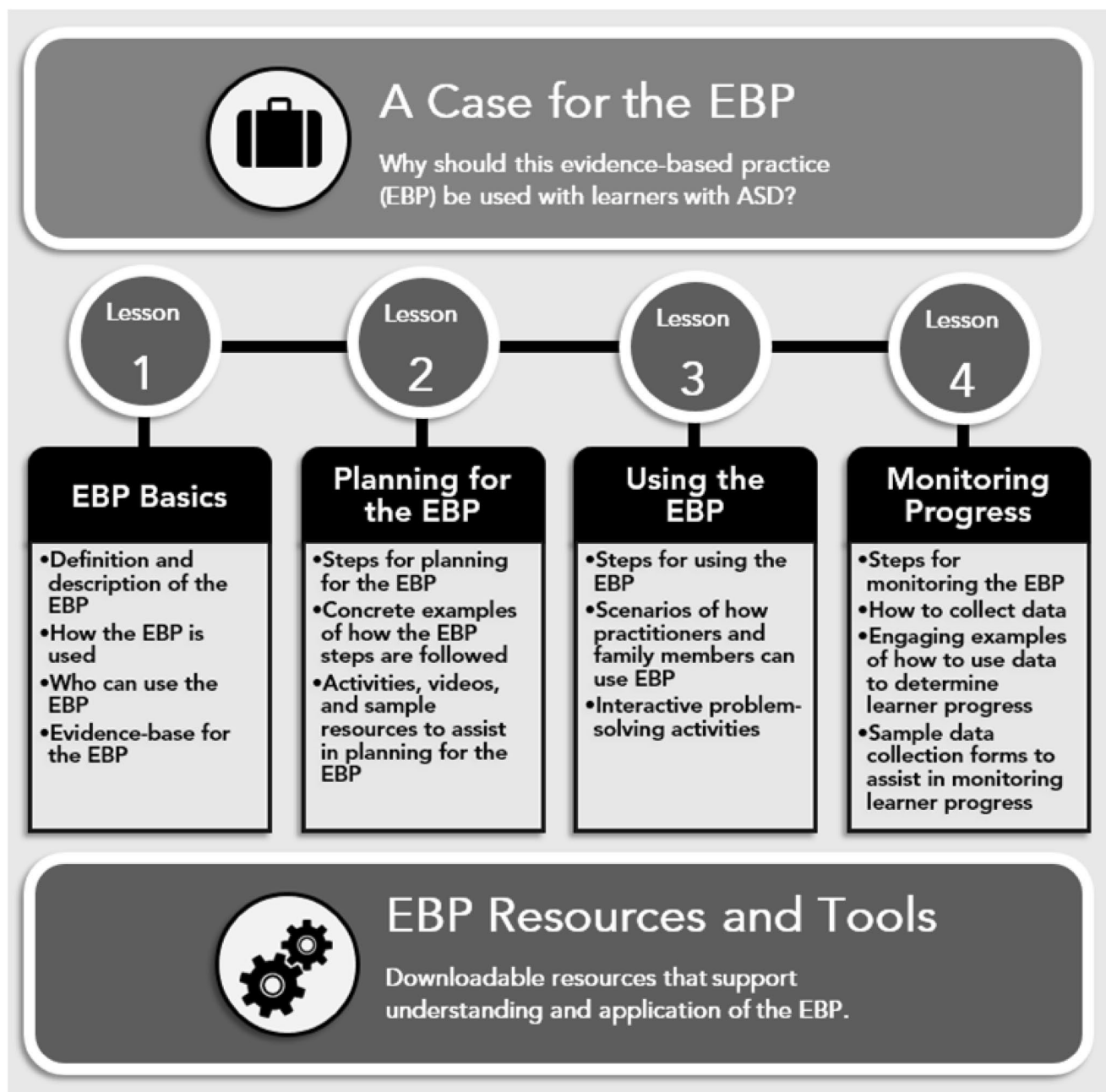
Fig. 1 AFIRM module structure (2015). AFIRM = Autism Focused Intervention Resources and Modules; ASD = autism spectrum disorder

the AFIRM website describes a process that draws on various sources of information. This process begins with the teacher's identification of an observable and measurable goal for the student. The goal will fall into a general outcome area (e.g., social, communication, academic, etc.). The NPDC team established a matrix that lists all 27 EBPs and the general outcomes areas for which there is efficacy evidence (see Fig. 2). From this matrix, practitioners can identify the EBPs that may be effective for a specific goal and student with ASD. Often there are several EBPs that have evidence in an outcome domain (e.g., nine EBPs have evidence of efficacy in the social domain for 14–22-year-old students). Practitioners use further contextual information (e.g., resources of classroom, knowledge of practitioner, parent priorities, etc.) to select a specific EBP.

On June 18, 2015, the AFIRM website launched and became available to the public. AFIRM requires users to establish an account, free of charge, and provide demographic information (e.g. geographic location, occupation, and the age range of students with which they currently work

Fig. 2 Matrix of evidence-based practices by outcome and age in years (NPDC 2017a, b). Colored in gray boxes indicate outcomes respective to the evidence-based practice and age in years range. Evidence-based practices from Wong et al. (2015). ABI = Antecedent-based intervention; CBI = cognitive behavioral intervention; DR = differential reinforcement; DTT = discrete trial training; ECE = exercise; EXT = extinction; FBA = functional behavior assessment; FCT = functional communication training; MD = modeling; NI = naturalistic interventions; PII = parent-implemented interventions; PMII = peer-mediated instruction and intervention; PECS = Picture Exchange Communication System™; PRT = pivotal response training; PP = prompting; R+ = reinforcement; RIR = response interruption and redirection; SC = scripting; SM = self-management; SN = social narratives; SPG = structured play groups; SST = social skills training; TA = task analysis; TAII = technology-aided instruction and intervention; TD = time delay; VM = video modeling; VS = visual supports

with). In addition, when beginning work on an AFIRM module users can select to receive a certification of completion or just open the module without a certificate. To receive the certificate of completion, consumers must complete a knowledge (of the specific EBP) pre-test, each lesson, the knowledge post-test, and the module evaluation.

Data Collection for AFIRM

Google Analytics and descriptive statistics were used to gather information about user characteristics and to determine how users interact with features of the AFIRM website (i.e., downloadable materials, page views, session lengths, and certificates awarded). Users who selected the certificate track completed a pre-test and post-test and an evaluation to receive a certificate of completion. While optional for users who did not select the certificate track, the evaluation focused on the quality, relevance, usefulness of the completed module, as well as the module's fulfillment of the stated learning objectives. This evaluation consisted of four Likert-type items that had four rating points, with four being the highest rating. Also, there was a fifth open-ended

item that allowed users to provide comments, although these comments have not been systematically analyzed for content yet and do not appear in the report.

Results

In this section, results are grouped by the study questions.

Who Has Used the AFIRM Modules and Resources?

As of December 3, 2018, AFIRM had 64,823 registered users. Users of AFIRM have grown steadily since the public launch of AFIRM in June 2015 (see Fig. 3). A total of 56,602 users are in the United States and 8221 are international users from 178 countries. In the United States, California (n = 13,224), North Carolina (n = 3604), Texas (n = 3130), Michigan (n = 2201), and Pennsylvania (n = 2147) have the most AFIRM users. Internationally, Canada (n = 2601), Australia (n = 1481), and the United Kingdom (n = 411) have the most users.

Fig. 3 Cumulative frequency of new users of AFIRM. AFIRM = Autism focused intervention resources and modules
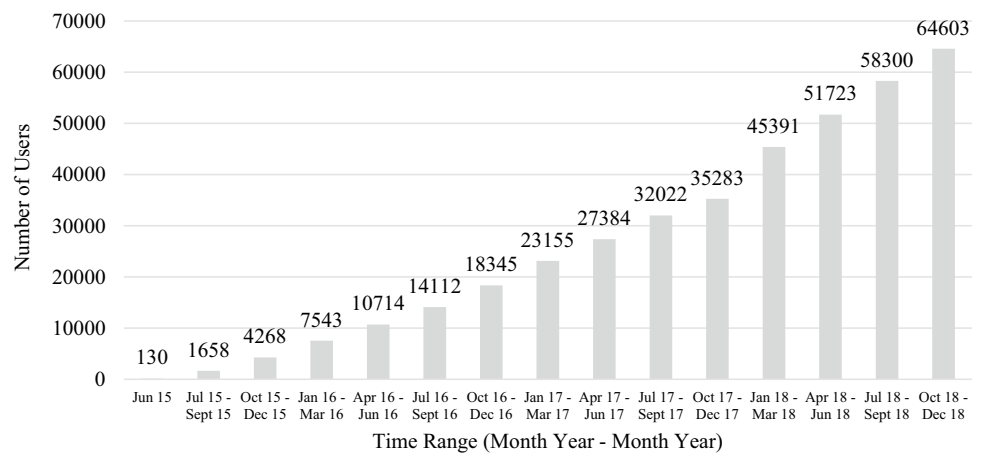
Table 1 AFIRM user occupation

Occupation	n
Administrator	2701
Early interventionist	3517
Family member	1301
General education	3254
Health care provider	1982
Other	7432
Paraeducator	7568
Related service provider	5349
Special education	17,089
Technical assistant provider	1105
University Faculty	1473
University Student	12,052
Total	64,823

AFIRM Autism focused intervention resources and modules

Table 2 AFIRM resources and tools downloads

Resource and tools downloads	n
EBP-matrix	6988
EBP CEC professional standards	8705
CEC professional standards	9921
Additional resources	13,268
Parent's guide	14,413
Professional tip sheet	18,935
Implementation checklist	21,803
Step-by-step guide	23,830
Evidence-base	30,684
Planning worksheets	48,101
Other (diagrams, charts, decision trees)	63,991
EBP brief packet	67,333
Data sheets/progress monitoring	75,441
Pictures	130,086
Total	533,499

AFIRM Autism focused intervention resources and modules, *EBP* evidence-based practice, *CEC* Council for Exceptional Children

The types of AFIRM users appear in Table 1. Users identified themselves as special education professionals (n = 17,089), university students (n = 12,052), paraeducators (n = 7568), other (n = 7432), and related service providers (n = 5349). Fewer users identified as technical assistant providers (n = 1105), family members (n = 1301), or university faculty (n = 1473; see Table 1). Users who currently work with students aged 6–11 years the most (n = 18,827), followed by students over the age of 15 (n = 17,925), between 3 and 5 years of age (n = 10,831), 12–14 years of age (n = 5449), and 0–2 years of age (n = 1927). Age of students was not applicable for 9864 users.

How Do Users Interact with Features of the AFIRM Website?

Users have logged on to AFIRM website and accessed content for 533,499 sessions. During these sessions, AFIRM users viewed 6,968,630 website pages of AFIRM content.

The average session lasts for 14 min and 37 s with users spending on average 1 min and 14 s on each page view. Users have downloaded 556,330 resources, documents, pictures, diagrams, and other content from the AFIRM website. Users were most likely to download pictures (n = 130,086) and other content (includes diagrams, charts, and decision trees; n = 63,991). Data sheets and progress monitoring are the most often downloaded (n = 75,441), followed by EBP Brief Packet (a combination of all available resources from the module; n = 67,333), and planning worksheets to use the practice (n = 48,101). See Table 2 for detailed description of content and downloads.

AFIRM offers free professional development certificates with corresponding professional development hours of training received. Practitioners and educators requested this feature to meet licensure requirements in respective fields.

As of December 3, 2018, AFIRM awarded 87,713 professional development certificates with 199,135 corresponding professional development hours of training (see Table 3). Users have received the most certificates for antecedent-based intervention (n = 8163), followed by visual supports (n = 7055), reinforcement (n = 6142), prompting (n = 6033) and functional behavior assessment (n = 5843). Modules with the fewest certificates earned are for pivotal response training (n = 215), technology-aided instruction and intervention (n = 529), and video modeling (n = 769; see Table 3).

What Knowledge Gains Did AFIRM Users Demonstrate?

As noted previously, to obtain a certificate for an AFIRM module, users must take a pre-test and post-test. These tests assessed content knowledge gains for users. Each test had ten questions and is scored on a 100-point scale. These data appear in Table 3. Users had the highest mean scores at pre-test for social skills training (n = 4511, mean = 82.00), naturalistic intervention (n = 1668, mean = 78.32), and scripting (n = 1168, mean = 74.21). Users had the lowest mean scores at pre-test for extinction (n = 1291, mean = 38.15), differential reinforcement (n = 2410, mean = 42.67), and self-management (n = 2874, mean = 49.39). To determine knowledge gain, a paired sample *t*-test was conducted on the pre-test and the first post-test taken by the user (i.e., users had the option to take the post-test multiple times). Significant change from pre-test to post-test occurred for all practices at the p < .001 level. Standardized mean difference effect sizes (ES) were computed for each practice using the Cohen's *d* formula. The mean ES was 0.84 (CI 0.84–0.85), with the ESs among individual practices ranging from 1.72 (CI 1.67–1.77) for Picture Exchange Communication System™ having the largest effect to 0.36 (CI 0.24–0.48) for technology-aided intervention and instruction having the smallest effect.

What Are the Users' Evaluations of the Usefulness, Relevance, and Quality of the Information Provided in Each Module?

As noted previously, AFIRM users have the option of providing an evaluation of the module following completion, if they did not select the certificate track, provided in Table 4. Users have provided 88,227 evaluations, with the average module rating being 3.51 (out of four). All modules rated as high quality (i.e., mean rating > 3.0) with the functional behavior assessment (n = 5870) module rated as the highest quality (mean = 3.57). While differential reinforcement (n = 2299) rated as the lowest in quality (mean = 3.40), although the mean score still qualified it as a high-quality module. Users found functional behavior assessment (n = 5870) to be the most relevant module (mean = 3.63) and exercise (n = 3964) to be the least relevant (mean = 3.36). Users found functional behavior assessment (n = 5870) to be the most useful module (mean = 3.59) and exercise (n = 3964) to be the least useful (mean = 3.34). The functional behavior assessment (n = 5870) module had the highest mean rating for meeting the learning objectives (mean = 3.58) and differential reinforcement (n = 2299) had the lowest (mean = 3.36).

Discussion

This is the first published analysis of a comprehensive web-based platform that has worldwide reach for supporting practitioners' use of EBPs for students with ASD. Building on a systematic review of the focused intervention practice research literature, the AFIRM website conveys basic information about practices, instructions for implementing the practices, tools for assessing fidelity of implementation, and instruments for collecting data on students' progress. The findings in this paper document that AFIRM is a widely used resource with consumer use steadily accelerating since its launch. Most of the users are from the United States, but there is also a substantial number of consumers from other countries, with at least some modules accessed by users in nearly all the countries in the world. The largest number of users are from the field of special education, but they only represent a little over 25% of the full set of users. There are also a substantial set of users who are related services providers (e.g., speech pathologists), general education teachers, early interventionists, and administrators. In addition, it appears that the modules are used in university classes, given that university students are the second largest group of users. Overall, practitioners indicated in their evaluations that the EBPs' content and resources on the site are useful and relevant to their work.

The pattern of use of the modules (as documented by certificates issued) reflects interests in basic applied behavior analysis instructional/intervention strategies, such as antecedent-based intervention, reinforcement, prompting, and functional behavior assessment. Visual supports is the lone practice among the top five that was an exception, having its foundational roots in the TEACCH program. Alternatively, the least frequently used practices were pivotal response training, technology-aided instruction and intervention, video modeling, response interruption and redirection, and structured play groups. For structured play groups, most of the evidence was for preschool-aged children, so the restricted age-range may account for usage patterns. Response interruption and redirection focuses on behavior reduction, which may apply to a subset of children with ASD for whom practitioners provide service. The low usage data for video modeling was a surprise given that the video

Table 3 AFIRM professional development and knowledge gained

Module	n	Certificates	PD hours	Pre-test		Post-test		df	t Test*	Effect size** (CI lower–upper)
				M	SD	M	SD			
Antecedent-based intervention (ABI)	8482	8163	16,326	54.95	17.86	66.93	18.13	8481	59.66	0.67 (0.63–0.67)
Cognitive behavioral intervention (CBI)	2895	2844	5688	69.82	18.37	78.77	17.49	2894	28.61	0.50 (0.45–0.55)
Differential reinforcement (DR)	2410	2247	6741	42.67	17.14	58.12	21.84	2409	34.82	0.79 (0.73–0.85)
Discrete trial training (DTT)	4817	4722	14,166	68.65	16.01	80.04	15.11	4816	48.83	0.73 (0.69–0.77)
Exercise (ECE)	4046	3929	7858	57.10	16.00	68.63	16.40	4045	41.95	0.71 (0.67–0.76)
Extinction (EXT)	1291	1211	2422	38.15	15.84	55.89	20.60	1290	31.59	0.97 (0.88–1.05)
Functional behavior assessment (FBA)	6006	5843	11,686	73.24	15.83	87.50	14.12	6005	72.42	0.95 (0.91–0.99)
Functional communication training (FCT)	2901	2861	5722	62.03	19.54	79.34	18.61	2900	51.03	0.91 (0.85–0.96)
Modeling (MD)	4505	4423	8846	63.56	18.78	83.30	18.25	4504	72.22	1.07 (1.02–1.11)
Naturalistic interventions (NI)	1668	1631	3262	78.32	15.91	89.62	12.67	1667	30.67	0.79 (0.72–0.86)
Parent-implemented interventions (PII)	1238	1227	2454	62.78	21.40	74.66	18.94	1237	47.03	0.59 (0.51–0.67)
Peer-mediated instruction and intervention (PMII)	3463	3360	6720	63.66	17.01	78.89	18.37	3462	76.42	0.86 (0.81–0.91)
Picture Exchange Communication System™ (PECS)	4191	4085	12,255	53.98	13.75	77.67	13.87	4190	28.49	1.72 (1.67–1.77)
Pivotal response training (PRT)	221	215	645	52.85	16.88	70.32	18.08	220	15.32	1.00 (0.80–1.19)
Prompting (PP)	6248	6033	18,099	54.69	19.06	78.28	20.38	6247	87.27	1.20 (1.16–1.23)
Reinforcement (R+)	6260	6142	18,426	71.47	18.06	86.19	15.30	6259	69.50	0.88 (0.84–0.92)
Response interruption and redirection (RIR)	937	911	1822	49.87	15.99	64.55	19.37	936	23.77	0.83 (0.73–0.92)
Scripting (SC)	1168	1143	2286	74.21	18.29	89.49	12.72	1167	29.68	0.97 (0.88–1.06)
Self-management (SM)	2874	2733	5466	49.39	16.97	73.67	19.71	2873	64.67	1.32 (1.26–1.38)
Social narratives (SN)	3789	3674	7348	59.01	18.09	80.64	17.56	3788	70.67	1.21 (1.16–1.26)
Structured play groups (SPG)	1014	997	1994	59.91	17.52	78.40	18.16	1013	32.62	1.04 (0.94–1.13)
Social skills training (SST)	4511	4393	8786	82.00	17.37	90.05	13.35	4510	36.11	0.52 (0.48–0.56)
Task analysis (TA)	4225	4106	8212	64.57	17.80	78.96	15.38	4224	53.61	0.87 (0.82–0.91)
Technology-aided instruction and intervention (TAII)	542	529	1323	86.31	19.32	92.27	12.93	541	8.35	0.36 (0.24–0.48)
Time delay (TD)	2505	2467	4934	55.80	18.49	80.31	19.07	2504	62.53	1.30 (1.24–1.37)
Video modeling (VM)	791	769	1538	69.75	20.31	82.28	16.07	790	20.19	0.68 (0.58–0.79)
Visual supports (VS)	7200	7055	14,110	53.19	17.02	77.96	18.32	7199	107.79	1.40 (1.36–1.44)
Total/average	90,198	87,713	199,135	61.76	20.20	78.34	19.03	90,197	261.92	0.84 (0.84–0.85)

Evidence-based practices from Wong et al. (2015). Mean range 0 (none correct) to 100 (all correct)

AFIRM Autism focused intervention resources and modules, *PD* professional development, *CI* conference intervals, *M* mean, *SD* standard deviation, *df* degrees of freedom

*All comparisons significant at p <.001 level

**Cohen's *d* effect size

Table 4 AFIRM module evaluation ratings

Module	n	Quality	Relevant	Useful	Met LOs	Average
Antecedent-based intervention	8310	3.45	3.56	3.49	3.46	3.49
Cognitive behavioral intervention	2860	3.49	3.46	3.43	3.48	3.46
Differential reinforcement	2299	3.40	3.46	3.42	3.36	3.41
Discrete trial training	4752	3.49	3.53	3.49	3.49	3.50
Exercise	3964	3.45	3.36	3.34	3.42	3.39
Extinction	1225	3.41	3.50	3.48	3.40	3.45
Functional behavior assessment	5870	3.57	3.63	3.59	3.58	3.59
Functional communication training	2879	3.53	3.58	3.53	3.55	3.55
Modeling	4452	3.54	3.58	3.54	3.55	3.55
Naturalistic interventions	1634	3.56	3.59	3.54	3.57	3.57
Parent-implemented interventions	1233	3.48	3.51	3.46	3.49	3.49
Peer-mediated instruction and intervention	3374	3.50	3.48	3.45	3.50	3.48
Picture Exchange Communication System™	4112	3.55	3.54	3.51	3.55	3.54
Pivotal response training	216	3.45	3.51	3.47	3.48	3.48
Prompting	6023	3.45	3.50	3.45	3.45	3.46
Reinforcement	6153	3.53	3.60	3.56	3.56	3.56
Response interruption and redirection	918	3.48	3.56	3.51	3.47	3.50
Scripting	1146	3.50	3.52	3.49	3.52	3.51
Self-management	2751	3.48	3.49	3.46	3.48	3.48
Social narratives	3694	3.53	3.55	3.52	3.54	3.53
Structured play groups	999	3.49	3.48	3.45	3.51	3.48
Social skills training	4362	3.52	3.57	3.52	3.54	3.54
Task analysis	4129	3.52	3.54	3.51	3.52	3.52
Technology-aided instruction and intervention	532	3.57	3.55	3.51	3.57	3.55
Time delay	2461	3.49	3.49	3.48	3.49	3.49
Video modeling	774	3.56	3.56	3.52	3.56	3.55
Visual supports	7105	3.49	3.57	3.53	3.52	3.53
Total/average	88,227	3.50	3.53	3.49	3.50	3.51

Evidence-based practices from Wong et al. (2015). Quality, relevant, useful, and met learning objectives range from 1 (very low) to 4 (very high)

AFIRM Autism focused intervention resources and modules, *LO* learning objectives

modeling literature is expanding rapidly (Schaeffer et al. 2016) and its use in schools appears to be increasing with the ease of use of smartphone video technology. The pivotal response training module was the last to go online, so usage rate may increase sharply in the future. For technology-aided intervention and instruction, it may be that this category contains such a diverse set of interventions (e.g., it includes augmentative and alternative communication (AAC) devices and computer-based instruction) that more specificity is needed for this module.

AFIRM users reported that the modules were useful and relevant to their work with children and youth with ASD. This additional evaluation information provides some evidence of social validity (Wolf 1978) for the AFIRM modules. Anecdotally, paraeducators provided feedback that it would be helpful to modify the modules to make them more relevant for their level of professional preparation (i.e., in the U. S. paraeducators generally do not have a bachelors-level

college degree). A project is now underway to design modules for paraeducators focusing on basic instructional practices (e.g., reinforcement, prompting, time delay, and visual supports). Although, the same themes have not emerged from the comments from families, a logical and potentially valuable extension of this information would be to modify information about EBPs so that it would be easily acceptable, understandable, and useful for family members. Such information could guide family members in advocating for the use of specific practices in the intervention services their children and youth with ASD receive, as well as incorporating, as appropriate, such practices into their parenting.

It is important to acknowledge that learning about EBPs is just the first step to implementation of such practices with fidelity in programs for children and youth with ASD. In addition, having specific guidance on how to implement the practice is important. As a feature of the modules, Sam et al. (2018) created an implementation checklist to

support practitioners and educators in using online modules to improve practices. These steps involved planning how to use online resources (assessing own knowledge, setting goals, learning contracts, and gathering needed resources), using the online resources (completing lessons, applying learning, seeking support, and modeling learning process), and monitoring progress. Yet, even these resources alone may not be enough to ensure implementation with fidelity. Embedded and sustained coaching may be needed to change practice (Campbell and Neinuwerburgh 2017). Such coaching support may be provided directly in classrooms or other programs by a coach who is onsite periodically and provides performance feedback (Reinke et al. 2014), a peer colleague or master teacher who can allocate time for coaching (Ma et al. 2018), or virtual coaching provided through telecommunication and video-technology for sites situated in remote locations (Vernon-Feagans et al. 2015). In addition, implementation scientists note that any such support, like coaching, would be situated within a broader system that would have to have the will and capacity to support such activities (Aarons et al. 2011). Development of such options for additional support should be the focus of future research and development.

Knowledge about interventions that work for children and youth with ASD continues to emerge. The National Clearinghouse for Autism Evidence and Practice (NCAEP; see https://ncaep.fpg.unc.edu) is now carrying on the initiative begun by NPDC. NCAEP is updating the NPDC review, adding the intervention research literature published between 2012 (i.e., where the previous review ended) and 2017. As noted previously, in their original review NPDC began with an initial set over 29,000 articles (Wong et al. 2014, 2015). Between 2012 and 2017, NCAEP researchers located an additional 31,000 articles, which reflects the acceleration in the rate of intervention research published. The implications for the future development of the AFIRM program is that the latest information needs to be incorporated into existing models and new modules may need to be developed as new evidence emerges for other focused intervention practices.

It is important to note that while use of EBPs may enhance goal achievement and learning for children and youth with ASD and fulfills the expectation of federal law that teaching practice be based on research, there may be positive secondary effects for teachers. Teacher burnout is a problem in special education (Billingsley 2004; Wisniewski and Gariulo 1997). There is a growing body of literature indicating that implementing a high quality program that employs EBPs and is aligned with one's teaching philosophy may be related to lower burnout (Coman et al. 2013); receiving training and use of evidence-based strategies results in higher levels of teacher self-efficacy which is a buffer to burnout (Corona et al. 2017); and specific use of evidence-based practices is related directly to lower levels of burnout

across a school year (Quellette et al. 2018). All depending on access to practical procedural knowledge about EBPs, as provided by AFIRM, and subsequent training with support.

In conclusion, the information available through AFIRM could be one part of a process for supporting practitioners' use of focused intervention practices having evidence of efficacy with children and youth having ASD. AFIRM introduces and provides basic procedural information about each EBP, but additional support through coaching and feedback may be necessary to move the practice into sustained use with fidelity in programs. Because knowledge about intervention practices continues to grow, it will be important for AFIRM to become dynamic in its organization by incorporating the latest information into the intervention information disseminated.

Compliance with Ethical Standards

Conflict of interest Dr. Ann Sam, Dr. Ann Cox, Dr. Melissa Savage, Ms. Victoria Waters, Dr. Samuel Odom declare that they have no conflict of interest.

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