

# Who benefits and when? Understanding differential treatment effects of an online professional development program

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## ABSTRACT

The quality of educational experiences has a direct impact on children's development and overall wellbeing. To ensure that children receive high-quality education experiences it is important that educators are trained in current best practices and feel efficacious in the implementation of these practices. Professional development (PD) has shown to be an effective mechanism for addressing educator knowledge and promoting feelings of self-efficacy. However, multiple barriers exist to delivering in-person PD (e.g., time and resource constraints). Online PD represents an attractive alternative for many educators, but the research on the effectiveness of online PD is mixed. The current study evaluates the effectiveness of a series of PD courses designed to promote positive youth development and identifies subgroups of educators who benefitted from the courses more than others. Results indicated improvement in feelings of self-efficacy around the implementation of practices to promote positive youth development, but new teachers in afterschool programs benefitted more than other educators.

**Keywords:** professional development, teacher self-efficacy, positive youth development

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## INTRODUCTION

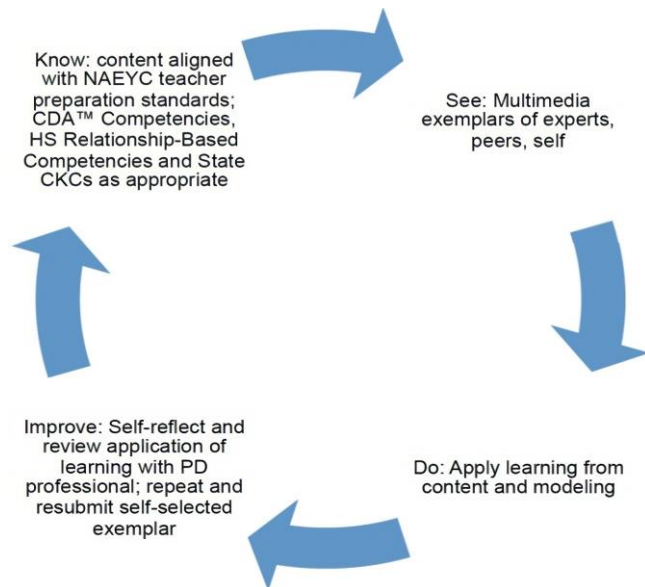
The quality of educational experiences has a direct impact on children's development and has been shown to predict academic, social, and emotional outcomes of children of all ages (see Barnett, 2011; Burger, 2010 for reviews). To ensure children and youth receive high-quality formal educational experiences it is paramount that their educators are properly trained in current educational theories and best-practices and feel self-efficacious in implementing these practices in their classrooms. This can be accomplished through evidence-based, theory-informed professional development (PD) opportunities (Postholm, 2012).

PD can be delivered through a variety of mechanisms including in-person and online trainings, both of which present their own advantages and disadvantages. In-person PD often has a limited reach as it is dependent on participant attendance and the number of available facilitators (Powell & Bodur, 2019; Zaslow et al., 2010). Conversely, while online PD has the potential to reach a vast audience, the research on the effectiveness of online PD remains mixed, likely due to varying levels of intensiveness and a lack of attention to theory behind effective delivery mechanisms (Bragg et al., 2021; Dede et al., 2009). In addition, while it appears that not all educators benefit equally from PD opportunities, there is little research on educator characteristics (e.g.,

experience) or structural factors (e.g., program climate) that may moderate the effectiveness of online PD. Additional research is needed to unpack reasons why some online PD is effective and some is not and why some educators benefit more than others (Bragg et al., 2021; Dede et al., 2009). In the current study, these gaps were addressed through examining the effectiveness of a series of five online PD courses that provided strategies to promote positive youth development and were delivered to educators supporting children ranging from early childhood through school-age. The courses were available through a large United States (U.S.) university extension system and were intended to increase educators' feelings of self-efficacy around implementing established best-practices that have been shown to promote positive youth development. In addition, latent class analysis (LCA) with a distal outcome was used to identify specific subgroups of educators who participated in PD courses as well as identify educators who benefitted more than others.

### Appeal of Online Professional Development

While in-person PD has been shown to improve a variety of educational practices, costs, and a lack of time and resources can serve as barriers for educators to participate (see Zaslow et al., 2010 for review). As such, online PD represents an appealing alternative for many educators. However, online PD brings its own challenges including questions about how best to engage participants effectively



**Figure 1.** KSDI framework (Early Educator Central, 2015)

and how to follow an evidence-based delivery system like the know-see-do-improve (KSDI) framework (Figure 1) (Early Educator Central, 2015). KSDI consists of providing educators with

- (1) informational content (“know”),
- (2) examples of best practices in action (“see”),
- (3) opportunities to apply what was learned (“do”), and
- (4) a chance to reflect on the process (“improve”).

While utilizing KSDI framework can be challenging in an online environment, it is not impossible. Currently, there is a lack of research on identifying PD courses that have effectively implemented KSDI framework in an online environment. This is an important gap to address in order to better understand the potential of online PD to generate positive benefits among a wide audience as well as identify model online PD programs.

#### Moderating Effects of Professional Development

While the literature surrounding the effectiveness of online PD is not as robust as in-person PD, there is reason to believe that some educators benefit from online PD more than others, as is the case with in-person PD. For example, in reviews by Han and Weiss (2005) and Zaslow et al., (2010) on factors impacting the effectiveness of PD, the authors make the case that both educator factors (e.g., teaching experience and education) and structural factors (e.g., center climate and support provided to educators) likely influence how educators engage with PD, ultimately impacting the effectiveness of PD opportunity. It is also important to note that educator and structural factors are not always mutually exclusive. For example, educators have been found to feel more efficacious when they receive support from their supervisors (Guo et al., 2011). As such, examining the impact of educator and structural factors simultaneously is an important step to understanding what makes online PD effective (Berkel et al., 2011).

#### Leveraging a Large University Extension System to Deliver Online Professional Development Targeting Positive Youth Development

University’s cooperative extension systems in the U.S. are attractive mechanisms for delivering online PD, as they enable the merging of a strong research-base from university researchers and outreach efforts

from the university extension system, both of which are important for the effectiveness and reach of educational programs (see Diem et al., 2011; Spoth et al., 2011). One such entity is an organization housed under a large U.S. public university’s extension system and is a national leader in evidence-informed online PD for early care and education and youth development professionals. Since 2011, this organization has delivered online PD to over 600,000 educators from all 50 states and 69 countries.

Experts in online learning, PD, and positive youth development, from two large public universities in the U.S. collaborated to develop a series of five, two-hour online PD courses delivered through the established on-demand PD system. These courses were intended to enhance educators’ knowledge and feelings of self-efficacy around five foundational key competencies most relevant for promoting positive youth development as outlined by the National Afterschool Association (2011) and covered the following topics:

- (1) child and youth growth and development,
- (2) interactions with children and youth,
- (3) cultural competency and responsiveness,
- (4) safety and wellness, and
- (5) youth engagement.

PD courses were entirely optional, and educators were able to complete as many or as few of the courses as they would like. Each course provided two-hours worth of training meaning that educators could take up to 10 total hours of PD on positive youth development. All courses were available free of charge, but to receive a certificate of PD completion, a nominal \$5 was charged per course.

The positive youth development courses followed KSDI framework through incorporating narrative and informational reading throughout the courses (know), presenting short videos that aligned with the informational text and illustrated the theory and practices in action (see), providing multiple opportunities within the courses to apply and practice what was learned in the videos (do), and encouraging self-reflection through handouts, action plans, and assessments (improve).

#### Current Study

There were two primary aims of the current study:

- (1) evaluate the impact of the positive youth development courses on educators’ feelings of self-efficacy in applying the information from a topic and
- (2) identify educator (e.g., experience and education) and structural characteristics (e.g., educational setting that impacted the effectiveness of the courses using the three-step approach, BCH, introduced by Bolck et al., 2004).

In BCH approach, first LCA is used to identify subgroups of a sample based on multiple variables (in the current study: teacher education, teacher experience, educator role, and educational setting). Next, participants are weighted or assigned to their most likely latent class based partially on their posterior probabilities (i.e., a statistical value that indicates the probability that a participant would have the characteristics that define the latent class). Finally, regression analyses are run to examine if latent class membership predicts a given dependent variable (e.g., educators’ self-efficacy). This approach was thought to be particularly relevant in the current study given the wide variability in educators who access the on-demand PD system. In the

**Table 1.** Retroactive pre- & post-test scores for positive youth development content areas

Content area	Pre-test	Post-test	T
Child and youth growth and development	4.04	4.55	22.06 <sup>***</sup>
Interactions with children and youth	4.03	4.56	25.55 <sup>***</sup>
Cultural competency and responsiveness	3.63	4.01	18.34 <sup>***</sup>
Safety and wellness	4.32	4.70	15.97 <sup>***</sup>
Youth engagement	3.95	4.55	19.50 <sup>***</sup>

Note. <sup>\*\*\*</sup>  $p < .001$

current study, BCH approach was used to examine if positive youth development courses benefitted educators from certain latent classes more than others.

## METHOD

### Participants

Data was collected from educators accessing the online positive youth development courses through the on-demand PD system housed under the first author's university extension system ( $n=3,535$ ). Participants were predominantly female (90.3%) and European American/White (61.2%; African American 22.9%; Latinx 12.3%; Asian 2.5%; American Indian less than 1.0%; and Pacific Islander less than 1.0%).

Participants varied in terms of their role as an educator and the age of children they worked with [early childhood lead teacher 22.9%; early childhood assistant teacher 23.0%; classroom aide 6.9%; early childhood director 16.2%; early childhood home-based caregiver 3.5%; afterschool provider 17.7%; other role 9.9% (e.g., parent)], education (less than high school diploma 4.0%; high school graduate 44.4%; two-year associate's degree 15.8%; four-year bachelor's degree 25.6%; master's degree 9.5%; and doctoral degree 0.7%), and years of teaching experience (less than one year 15.7%; one-five years 26.7%; five-10 years 20.7%; 10-20 years 22.2%; over 20 years 14.6%).

### Measures

#### LCA indicators

For LCA, educator education, educator experience, educator role, and educational setting were recoded using the following criteria:

- (1) teacher education was coded to differentiate between educators who held four-year college degrees and those who did not (64.2% without a four-year degree; 35.8% with at least a four-year degree);
- (2) teaching experience was used to identify new teachers (less than five years' experience) and more experienced teachers (five years or more experience; new teachers 42.5%; experienced teachers 57.5%);
- (3) educator role was categorized as afterschool teacher (19.6%), lead teacher (lead teacher in an early childhood center classroom or early childhood home-based program 29.3%), assistant teacher (early childhood assistant teacher or aide 33.1%), and school director (18.0%); and
- (4) educational setting was categorized as center-based early childhood education program (60.2%), early childhood education home-based program (5.3%), and school-age program (e.g., afterschool program; 34.5%).

### Dependent variables

After completing a positive youth development PD course, educators completed an online survey with four retrospective pre-/post-test questions (i.e., the retrospective pre-/post-test questions were a part of the same survey) that aligned with the specific learning objectives for the positive youth development course they completed. In retrospective pre-/post-test assessments, participants are asked to respond to a question after completing a training (i.e., post-test) then to think back before they completed the activity and assess how they believe they *would have* responded prior to the training (i.e., retrospective pre-test). This approach has been shown to be advantageous over typical pre- and post-test designs as it is more adept in picking up perceived changes from the participant (Little et al., 2020).

Participants were asked to rate their feelings of self-efficacy in terms of their confidence in their ability to apply the content delivered in the courses on a 5-point scale (1=not confident at all, 2=somewhat not confident, 3=neither confident nor unconfident, 4=somewhat confident, 5=very confident). Sample items included: "When working with children and youth, I can recognize their individual differences and make changes to activities to meet these differences" (child and youth growth and development), "I can identify tools, resources, methods, and services that enhance multiage group communication and social interactions" (interactions with children and youth), "I can explain the elements that come together to define culture, and what culture competency means" (cultural competency and responsiveness), "I can analyze the indoor and outdoor environment with awareness of hazards and make corrections to prevent injury" (safety and wellness), and "I can summarize how to communicate with young people to increase youth voice" (youth engagement). Difference scores were created by subtracting the post-test score from the corresponding retrospective pre-test score and then averaged for each positive youth development content area (child and youth growth and development: mean  $[M]=.51$ , standard deviation  $[SD]=.70$ ,  $\alpha=.84$ ; interactions with children and youth:  $M=.52$ ,  $SD=.66$ ,  $\alpha=.87$ ; cultural competency and responsiveness:  $M=.38$ ,  $SD=.59$ ,  $\alpha=.58$ ; safety and wellness:  $M=.38$ ,  $SD=.58$ ,  $\alpha=.86$ ; youth engagement:  $M=.60$ ,  $SD=.74$ ,  $\alpha=.90$ ).

## RESULTS

Paired sample  $t$  tests were run to compare retrospective pre- and post-test scores across the five positive youth development content areas (child and youth growth and development, interactions with children and youth, cultural competency and responsiveness, safety and wellness, and youth engagement). Results indicated significantly higher post-test scores compared to retrospective pre-test scores across all five content areas, suggesting that participants felt more efficacious in their ability to perform activities relevant to promoting positive youth development after completing PD courses (Table 1).

**Table 2.** Three latent classes of educators

Participant characteristics	New assistant teachers (41%)	Experienced, educated, lead teachers & directors (36%)	Afterschool providers (18%)
Four-year college degree			
No	<b>0.86</b>	0.41	<b>0.63</b>
Yes	0.14	<b>0.59</b>	0.37
Teaching experience			
Zero-five years	<b>0.56</b>	0.15	<b>0.61</b>
More than five years	0.44	<b>0.85</b>	0.39
Educator role			
Lead teacher	0.25	<b>0.51</b>	0.03
Assistant or aide	<b>0.70</b>	0.00	0.19
Afterschool professional	0.05	0.03	<b>0.72</b>
Director	0.00	<b>0.46</b>	0.06
Educational setting			
Center-based early childhood education program	<b>0.83</b>	<b>0.70</b>	0.06
Home-based early childhood education program	0.04	0.10	0.00
School-age program	0.13	0.20	<b>0.94</b>

Note. Values represent probabilities of likelihood that an educator from class would possess characteristic

Fit indices from LCA indicated that three latent classes fit the data best. These classes varied from one another in terms of educator education, teaching experience, role, and educational setting. Classes were named based on the characteristics of the educators and the programs, where they worked (Table 2). One class was comprised of new assistant teachers or aides, who did not have a four-year degree, and were working primarily in center-based early childhood education programs. This class was named *new assistant teachers* (41.0% of participants). The second latent class comprised 36.0% of participating educators and was unique in that it was the only class, where participants were more likely than not to have a four-year college degree. This class primarily consisted of more experienced educators who were either lead teachers or directors in center-based early childhood education programs. This class was named *experienced, educated, lead teachers and directors*. The final class was unique in that it was the only one to primarily consist of afterschool professionals who were working in school-age programs. This class was named *afterschool providers* (18.0% of participants).

After establishing the three unique latent classes, participants were weighted to each latent class using the BCH approach and comparisons were made across latent classes on pre-test and difference scores for the five positive youth development content areas (Table 3). Results indicated that while educators had comparable pre-test scores on the *child and youth growth and development* and *youth engagement* content areas, they differed from one another on *interactions with children and youth*, *cultural competency and responsiveness*, and *safety and wellness*. These results indicated that educators had differing levels of self-efficacy around these content areas prior to completing the courses and these differences appeared to be primarily driven by lower self-efficacy pre-test scores among *afterschool providers* (Table 3). When examining change scores between retrospective pre- and post-test across latent classes, there was comparable improvement in self-efficacy only for the *youth engagement* content area. For *child and youth growth and development*, *interactions with children and youth*, *cultural competency and responsiveness*, and *safety and wellness*, the *afterschool providers* class appeared to benefit the most as they had significantly higher change scores than both the *new assistant teachers* and *experienced, educated, lead teachers and directors* classes (Table 3).

## DISCUSSION

While online PD is appealing to educators for multiple reasons (e.g., low-cost, more convenient, less time consuming and resource intense; Parsons et al., 2019) concerns regarding the effectiveness of the delivery method and a lack of attention to learning theories have been longstanding (Bragg et al., 2021). In a systematic review of online PD, Bragg et al. (2021) identify key elements of effective online PD, including attention to learning theories, as well as providing educators the opportunity to take in new information, apply what they learned, and self-reflect; all elements that align with KSDI framework. Our results are consistent with the elements of successful online PD outlined previously (Bragg et al., 2021) and suggest that online PD can have a positive impact on educators' feelings of self-efficacy when delivered using KSDI framework. The fact that the online PD courses were delivered through a U.S. university's extension system allowed for the combination of significant outreach and a strong research base, both of which are relevant for the ultimate success of PD (Spoth et al., 2011). Being able to successfully deliver online PD using KSDI framework carries important implications for the potential to reach a vast audience (Bragg et al., 2021; Diem et al., 2011). For example, the on-demand PD system utilized in the current study has users from 69 countries across the globe and the positive youth development courses in the current study were available to over 600,000 educators.

While there was improvement in feelings of self-efficacy from pre to post among the entire sample of educators, it is important to keep in mind that some educators benefitted more than others. Utilizing LCA and BCH approach allowed for the identification of unique subgroups of educators who appeared to benefit from the online PD courses more than others. Fairly consistently, educators from the *afterschool providers* subgroup demonstrated the most growth from before the positive youth development courses to after the courses were completed. This may be for a couple of reasons. The *afterschool providers* had lower pre-test scores than at least one other subgroups on three out of the five content areas. This would indicate that they likely were struggling the most in terms of their self-efficacy and had the most room for improvement. Previous research has demonstrated that afterschool providers are rarely provided PD opportunities, which likely has a negative impact on their level of preparedness (Bradshaw, 2015).



**Table 3.** Pre-test & change scores for each latent class

Positive youth development topic	New assistant teachers	Experienced, educated, lead teachers & directors	New afterschool providers
Retrospective pre-test			
Child and youth growth and development	4.01 <sup>a</sup>	4.10 <sup>a</sup>	4.02 <sup>a</sup>
Interactions with children and youth	4.10 <sup>a</sup>	4.10 <sup>a</sup>	3.93 <sup>b</sup>
Cultural competency and responsiveness	3.74 <sup>a</sup>	3.58 <sup>b</sup>	3.57 <sup>b</sup>
Safety and wellness	4.39 <sup>a</sup>	4.42 <sup>a</sup>	4.17 <sup>b</sup>
Youth engagement	4.07 <sup>a</sup>	3.88 <sup>a</sup>	3.92 <sup>a</sup>
Change score			
Child and youth growth and development	0.52 <sup>ab</sup>	0.43 <sup>b</sup>	0.58 <sup>a</sup>
Interactions with children and youth	0.44 <sup>b</sup>	0.48 <sup>b</sup>	0.63 <sup>a</sup>
Cultural competency and responsiveness	0.31 <sup>b</sup>	0.40 <sup>ab</sup>	0.44 <sup>a</sup>
Safety and wellness	0.36 <sup>ab</sup>	0.32 <sup>b</sup>	0.46 <sup>a</sup>
Youth engagement	0.53 <sup>a</sup>	0.64 <sup>a</sup>	0.61 <sup>a</sup>

Note. Means with different superscripts indicate statistical differences of  $p < .10$

Because of this, the content in the positive youth development courses may have been novel information to these providers, which would likely lead to greater gains in confidence than for educators who felt that they knew the information well already. In addition, the *afterschool providers* subgroup was unique in that it was comprised predominantly of educators working in afterschool settings with school-age children. The positive youth development courses were intended to increase knowledge and confidence working with youth in out-of-school settings, which was likely to be the case with the *afterschool providers*. Prior research has shown that participants learn more and are more engaged when PD content is relevant to them (Bragg et al., 2021; Desimone & Garet, 2015). While both the *new assistant teachers* and *experienced, educated, lead teachers and directors* benefitted from the positive youth development courses, it is possible that they felt that the course content did not align closely with their own work experiences and interests. These findings further indicate the utility of targeted PD and serve as a reminder that it is important for PD to be delivered to audiences who can relate to the topic material.

### Limitations & Future Directions

While the results in the current study are promising, it is important to recognize that the evaluation was merely on PD courses focused on a single topic area. It is unclear if KSDI framework would be as successful for PD targeting other educational topics. Similarly, the research on the effectiveness of online PD is relatively in its infancy and more research is needed to build the research base around online PD. Future studies can build on the current study through employing a similar design (e.g., KSDI framework) and evaluation methods (e.g., retrospective pre-/post-test) to see if comparable results are found.

LCA allowed for the identification of specific subgroups of educators who benefitted the most from PD opportunity. However, LCA is a data-driven approach (Collins & Lanza, 2009), meaning that different samples of participants may generate different subgroups. In addition, the organization delivering the on-demand PD in the current study is more well known among early childhood education professionals than educators serving school-age children, which is likely why there were two subgroups that were teaching in early childhood education programs (*new assistant teachers* and *experienced, educated, lead teachers and directors*) even though PD course was directed toward positive youth development. Future studies can build on findings from the current study by using LCA with samples comprised solely of afterschool and out-of-school time professionals to further unpack characteristics of educators who benefit the most from positive

youth development PD opportunities. Finally, while the results from the retrospective pre-/post-test are encouraging, all questions focused on educators' feelings of self-efficacy to apply information provided on a given positive youth development topic area. Although self-efficacy has been shown to predict behaviors (Holzberger et al., 2014) it is unclear if PD resulted in any changes in best-practice approaches and teaching practices around promoting positive youth development. Similarly, all outcome data came from educators' self-reports. Future studies can improve our understanding of the effectiveness of online PD with additional outcomes (e.g., behaviors) as well as data collection methods (e.g., observations or interviews).

## CONCLUSIONS

Given an ongoing need for PD among educators, along with the challenges that in-person PD present (e.g., lack of resources, Powell & Bodur, 2019), and the need for evidence-informed online PD that has been exacerbated by the COVID-19 pandemic (Jalongo, 2021), it is imperative that we gain a better understanding of appropriate methods to effectively deliver online PD. Limitations in the current study notwithstanding, it would appear that online PD courses can be effective when implementing KSDI framework, at least in terms of enhancing educators' feelings of self-efficacy in promoting positive youth development. The fact that online PD courses were delivered successfully through a large U.S. university extension system carries important implications for potential reach of PD. University extension systems may be an ideal vehicle for ensuring that evidence-based PD can reach a vast audience, given both extension's focus on research and outreach. Finally, while online PD courses were effective, it is worth noting that some educators benefitted more than others, which serves as a reminder that prior levels of preparedness and alignment between audience and content is relevant for success of online PD.

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**Declaration of interest:** The authors declare no competing interest.

**Data availability:** Data generated or analyzed during this study are available from the authors on request.

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