Introduction

The health benefits associated with participation in physical activity are well established. Most youth, however, are not meeting current recommendations. According to the NHANES National Youth Fitness Survey (NNYFS) conducted in conjunction with the National Health and Nutrition Examination Survey (NHANES) in 2012, only 42% of youth aged 12-15 have adequate cardiorespiratory fitness levels. Recent findings also indicate lower levels of aerobic fitness are associated with higher rates of overweight and obesity. The 2018 Guidelines Advisory Committee Scientific Report found that for prospective research, physical activity and overweight/obesity are inversely associated. Children who are from under-resourced communities and diverse racial, ethnic, and cultural backgrounds are less likely to meet the minimal national standards for physical activity and more likely to suffer from negative health effects related to a lack of physical activity. Because of the personal, social, and built-environment limitations on under-resourced communities, African American and Hispanic youth have substantially higher levels of overweight and obesity compared to their Caucasian counterparts, placing racial/ethnic minority populations at a greater risk of health complications later in life.

Research suggests access to recreational trails and transportation systems (pedestrian, bicycling, and public transit) combined with physical activity-friendly destinations can increase physical activity participation; however, a vastly understudied area is the impact of trails on the physical activity behaviors of youth from under-resourced communities. To address these gaps in knowledge, the National Collaborative on Childhood Obesity Research (NCCOR) formed a scientific workgroup to investigate effective interventions and programs for increasing trail use among youth from under-resourced communities. NCCOR first reviewed the scientific research to identify if effective trail use programs for youth have been evaluated for efficacy or effectiveness using quasi-experimental or experimental designs. In brief, limited experimental research was found that evaluated the effectiveness of trail use youth program outcomes. However, research did identify characteristics of the built environment that may promote trail use among youth (e.g., lighting, reduced automobile traffic or speed, connecting trails to destinations, etc).

In this program brief, we highlight findings from a second project approach, which involved a search and review of gray literature sources (e.g., websites, government or organizational reports, success stories) to identify programs promoting trail use among youth that are accompanied by process or outcome evaluation data. These programs and data could be used to inform future research and practice.

FOR MORE INFORMATION ON THE SCIENTIFIC REVIEW, SEE:

well as some future considerations to improve them.

Below we discuss common strengths of these programs as detailed information on each program is highlighted in table 1.

Nine successful trail programs (Box 3) identified a variety of settings where youth are physically active on trails. These successful programs included walking and hiking programs, overnight trails programs, and biking programs on trails. More detailed information on each program is highlighted in table 1. Below we discuss common strengths of these programs as well as some future considerations to improve them.

**Box 3 Programs Included in Review**

1. Adventure Clubs – Trips for Kids
2. Gateway to the Great Outdoors
3. Momentum Bike Clubs – Institute on Family and Neighborhood Life at Clemson University (IFNL)
4. Schools on Trails – Anchorage Park Foundation
5. Teens on Trails – Golden Gate National Parks
6. TRACK Trails – Kids in Parks
7. Transit to Parks and Trails – LA Nature for All
8. Week-Long Expeditions – Big City Mountaineers

**Strengths**

**Program Reach/Scalability**

Several programs demonstrated extensive program reach and scalability. The *Kids in Parks* TRACK trails program stands out in its ability to expand across a large geographic range over the past decade. While the program began as a regional program in North Carolina, the program expanded to parks across the country due to its demonstrated effectiveness and ease of implementation. Today, there are more than 190 TRACK Trails in twelve states, Washington DC, and the Eastern Band of the Cherokee Nation.\(^{29}\) Two additional programs, *Big City Mountaineers’ Week-Long Expeditions* and *Trips for Kids*, have demonstrated growth in their programming. *Big City Mountaineers’ Week-Long Expeditions* has programming in seven states and has reached more than 10,000 youth\(^{30}\) and *Trips for Kids* has programming in three states and has reached more than 200,000 youth.\(^{31}\)

**Focus on Under-Resourced Communities**

Several programs demonstrated exemplary efforts to reach children facing barriers to trails due to limited resources. The *Transit to Parks and Trails* program worked with local communities and local elected officials in Los Angeles to provide more connections, via public transit to parks, for those in neighborhoods without parks and open green spaces.\(^{32}\) Many of the programs highlighted in this brief work specifically with under-resourced communities, including the *Big City Mountaineers*, who partner with youth agencies that serve teens from economically or socially depressed areas.\(^{30}\) Additionally, *Trips for Kids* recruits participants for their *Adventure Clubs* from neighborhoods, schools, agencies, and community organizations in mostly under-resourced areas.\(^{30}\) *Momentum Bike Club* establishes bike clubs in under-resourced communities and schools throughout Greenville County, SC.\(^{31}\)

Some programs took additional steps to address barriers. For example, the *Youth Volunteer Vacations* program from the Washington Trail Association acknowledges that a significant barrier to using trails is the lack of representation. They developed shared-identity trips for participants to have an inclusive introduction to camping, trail work, and hiking where youth identities are recognized and celebrated. They currently have an All Latina Crew, All Girls Crew, and an LGBTQ+ Crew.\(^{34}\)

**Program Evaluation**

The strongest trail programs collect data to evaluate the programs’ impact and accessibility. For example, the *Kids in Parks* TRACK trails program collects data about its users through its website where youth can register their hikes to earn incentives. The website has two main purposes: 1) to incentivize physical activity behavior and 2) to collect participation data. Kids need to answer a series of 12-15 questions about their Park adventure, their likes and dislikes, who they were with, date and time of visit, etc.\(^{27}\) The Center for Training and Research Translation (Center TRT) reviewed the *Kids in Parks* program for its objective to increase the appeal of existing parks with hiking trails and thereby attract families with young children and teens.\(^{31}\) The online data collected by the *Kids in Parks* program suggests that the program has been effective at reaching their objective.\(^{35}\) Data from approximately 600 registered users showed that more than 40% stated that they came specifically to the park to hike the TRACK trail, 60% reported never having been to the park before, and 25% had never been hiking before hiking on a TRACK trail.\(^{35}\)

The *Gateway to the Great Outdoors* program partnered with the Brown School at Washington University in St. Louis to conduct mixed-methods evaluations of their program. Students complete pre-intervention and post-intervention surveys with validated measures that were developed to...
determine how the intervention influences their health, wellbeing, science knowledge, and environmental awareness. They also have students participate in photovoice activities, and the program conducts surveys with partner public-school teachers to better understand how the intervention influences students’ educational attainment, health, and wellbeing. Findings showed the program participants had significant improvements in health-related quality of life (HRQoL). These were significantly greater than changes observed in a control group of students who did not participate in the program, suggesting that the intervention and other nature-based programs may have positive impacts on the HRQoL of adolescent youth.

The Week-Long Expeditions program utilizes the 40 Developmental Asset Profile Assessment, a set of identified positive supports and strengths that young people need to succeed. The assessment found the program had the greatest impact on positive values (integrity, honesty, responsibility, and avoiding use of alcohol, tobacco, and drugs), social competencies (decision-making, conflict resolution, building friendships, and avoiding negative peer pressures), and positive identity (self-esteem, purpose, and positive view). Additionally, the Momentum Bike Club used interviews to document emotional/social health and measures such as ability to take on leadership roles, work with a team, and follow directions. The Youth Volunteer Vacations program used surveys to assess if participants felt welcome and safe on the trails, important perceived barriers or facilitators to program participation.

Future Considerations For Improving Youth Trail Programs

Program Length and Timing
Many of the programs were only administered in the summers and/or on weekends, which is not ideal for meeting weekly physical activity needed by youth during other seasons or by being active on other days of the week. Physical activity programming is needed year-round to provide children options for daily physical activity to improve their health. Practitioners may look to combining outdoor experiences with Science, Technology, Engineering, Art, and Math (STEAM) programs. One analysis shows urban low-income Black and Hispanic children 10–15 years of age had significant positive changes in STEAM capacity and other seasons or by being active on other days of the week. Physical activity programming is needed year-round to provide children options for daily physical activity to improve their health. Practitioners may look to combining outdoor experiences with Science, Technology, Engineering, Art, and Math (STEAM) programs. One analysis shows urban low-income Black and Hispanic children 10–15 years of age had significant positive changes in STEAM capacity and health-related quality-of-life domains after participating in a 15-week nature-based education intervention.

Program Evaluation
Overall, there is a lack of evaluation on health metrics in trail programs that would be of interest to the childhood obesity field. The consistent use of high-quality, comparable measures and research methods across childhood obesity prevention and research and program evaluation is important because it allows science and practice in childhood obesity prevention to progress in a systematic way, a top priority for NCCOR (see Box 4).

Future Considerations for Improving Youth Trail Use

Connect Trail Use Interventions with Built Environment Approaches
Based on a systematic review of the literature, sufficient evidence documented by the Community Preventive Services Task Force (CPSTF) indicates built environment approaches that combine one or more interventions to improve pedestrian or bicycle systems with one or more land use and environmental design interventions are effective in increasing physical activity. The CPSTF recommendation encourages community planners, transportation, public health, and other professionals to consider making communities more activity-friendly by linking safe (pedestrian, bicycling, and public) transportation routes with everyday destinations where people live, shop, work, go to school, and seek recreation (e.g., parks, greenspaces). Trails (routes) used for active commuting or recreation that are connected to programs supporting use of trails (destinations) can lead to increases in physical activity among participants. The CPSTF and other experts additionally recommended trail development, enhancements, connectivity and programming be paired with efforts to increase awareness of new or enhanced opportunities to be more physically active through active commuting and leisure or recreational physical activity (e.g., use of park trails). In addition, the 2018 Report Card on Physical Activity for Children and Youth highlights the importance of improving community and built environment supports to increase physical activity, with a focus on under-resourced communities.

Funding
There is a lack of funding to promote trail use from under-resourced communities. Currently, many trails are funded through the federal Recreational Trail Program (RTP), which provides funds to states to develop and maintain recreational trails and trail-related facilities that can support additional

Box 4

**NCCOR Measures Registry**
Practitioners evaluating trail use programs may benefit from using NCCOR’s Measures Registry—a free, online repository of articles about measures—to find detailed information on measures on individual physical activity behaviors and physical activity environment. The Measures Registry also has corresponding user guides and learning modules that provide an overview of measurement, describe general principles of measurement selection, present case studies that walk users through the process of using the Measures Registry to select appropriate measures, and direct researchers and practitioners to additional resources and sources of useful information.
trail infrastructure in under-resourced areas. In 2018 the federal government authorized $82,365,802 for the RTP. States are required to use 30% of annual funds for non-motorized trails. In addition, the Great American Outdoors Act (August 2020) enables national parks and other federal lands to repair and upgrade vital infrastructure and facilities. These types of continued funding sources may encourage the development of new recreational trails to support trail programming to improve youth health.

A recently introduced bill, the Transit to Trails Act, calls for establishing a grant program under the Department of Transportation to provide transportation systems to and from under-resourced communities and public lands.

Conclusions

There are several existing programs that address the underuse of trails from participants from under-resourced communities. Each program is unique in how it promotes trail use whether through hiking, biking, or camping, but practitioners can learn from the promising approaches highlighted in this brief, such as how programs expanded their reach, focused on inclusion of under-resourced communities, and evaluated their programs. Evidence indicates that programs can be more effective if they are connected to interventions that improve the built environment (such as safe pedestrian, bicycling and public transportation routes), and combine efforts with educational movements like STEAM to expand reach and impact.

Improving program evaluation will help expand the practice-based evidence on trail-use programs and inform future research to provide greater scientific evidence on the effectiveness of trail-use programs. Information gained from additional scientific and practice-based studies will in turn help relevant organizations (those with missions to promote physical activity among youth from low-income and under-resourced communities) to obtain information and resources to continue to expand and strengthen trail-use policies and programs. These policies and programs should be designed for or be inclusive of Black, Indigenous and Youth of Color and be welcoming and safe for participation by youth regardless of disability status, gender, or sexual identity. Practitioners may look to partner with schools of public health who have expertise in these areas for support in evaluation.

Trail use and outdoor recreation is an important option for addressing youth inactivity and sedentary behavior. This project began before the state of the Coronavirus (COVID-19) global pandemic. The COVID-19 pandemic has exacerbated existing health disparities, and the impact of the pandemic will likely be felt for several years. Prevalence data indicates that children are too inactive, and the pandemic may be increasing this problem as children are in school virtually and after-school programs are limited. Care should be taken to modify programming in ways that ensure safety during the COVID-19 and future pandemics. While some of the programs highlighted in this brief temporarily paused due to COVID-19, some have adapted their programming by holding virtual programs, limiting trip capacity and the total number of trips offered. Technologies used to offer safe programming should be reviewed for future use. Even after pandemic protocols are unnecessary, these technologies can help reach youth who are geographically and/or socially isolated.

Future research and practice efforts are needed to establish programs to encourage youth to explore outdoor recreational opportunities. We propose researchers and practitioners work together to develop evaluation plans to better document program success and gather scientific evidence on how to best develop, implement, and evaluate effective trail programs. Such planning should also be inclusive of members from under-resourced neighborhoods and communities to develop programs that best meet their preferences and needs.
Table 1. Trail programs included in this Brief.

<table>
<thead>
<tr>
<th>ADVENTURE CLUBS • <a href="https://www.tripsforkids.org/">https://www.tripsforkids.org/</a></th>
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<tbody>
<tr>
<td>Description</td>
</tr>
<tr>
<td>Organization responsible for program management</td>
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<tr>
<td>Years in existence</td>
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<tr>
<td>Priority population</td>
</tr>
<tr>
<td>Length</td>
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<tr>
<td>Program reach</td>
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<tr>
<td>Measures of program impact</td>
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<tr>
<td>Evaluation Data/Findings</td>
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</table>

<table>
<thead>
<tr>
<th>GATEWAY TO THE GREAT OUTDOORS • <a href="https://www.gatewayoutdoors.org/">https://www.gatewayoutdoors.org/</a></th>
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<tbody>
<tr>
<td>Description</td>
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<td>Program reach</td>
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<td>Measures of program impact</td>
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<td>Evaluation Data/Findings</td>
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</tbody>
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### MOMENTUM BIKE CLUBS • [http://momentumbikeclubs.org/](http://momentumbikeclubs.org/)

**Description**  
Momentum Bike Clubs promotes vigorous exercise and healthy peer and mentor relationships. Eligible youth are recruited with the assistance of local community-based partners to connect them with volunteer adult mentors. Students and mentors bike together, form relationships, and see new parts of the outdoor community. The Bike Clubs students can participate in internships, trips, youth development seminars, and receive high school preparation resources. They also receive annual college scholarships and ongoing mentoring.

**Organization responsible for program management**  
Institute on Family and Neighborhood Life at Clemson University (IFNL)

**Location**  
Upstate South Carolina

**Years in existence**  
2010–present (10 years)

**Priority population**  
Middle and high school youth aged 10–18 years old from under-resourced schools

**Length**  
Throughout the school year

**Program reach**  
About 225 students each year

**Measures of program impact**  
Qualitative interviews with mentors, students, and parents are conducted; pre- and post-surveys that document program outcomes.

**Evaluation Data/Findings**  
Youth have collectively ridden over 110,000 miles since the program was founded. There is about a 30% return rate of students year to year.

### SCHOOLS ON TRAILS • [https://anchorageparkfoundation.org/programs/schools-trails/](https://anchorageparkfoundation.org/programs/schools-trails/)

**Description**  
Schools on Trails uses nearby trails, parks, streams, and natural habitats during school hours as outdoor learning spaces to educate students and staff about community assets, involve students in the process of civic engagement and project management, and connect schools and families to nearby public spaces. Students are involved in park improvement processes and assist with the design, planning, and construction stages.

**Organization responsible for program management**  
Anchorage Park Foundation

**Location**  
Anchorage, Alaska

**Years in existence**  
2016–present (4 years)

**Priority population**  
Children attending schools in the Anchorage area; usually students from title 1 schools

**Length**  
Throughout the school year

**Program reach**  
4,000 students in 2018/2019 school year

**Measures of program impact**  
Number of completed projects (this is for Anchorage Park Foundation overall, not split up for Schools on Trails in particular)

**Evaluation Data/Findings**  
There is a list of 100 completed projects on this website: [https://anchorageparkfoundation.org/completed-projects/](https://anchorageparkfoundation.org/completed-projects/)

### TEENS ON TRAILS • [https://www.parksconservancy.org/events/ocean-beach/teens-trails](https://www.parksconservancy.org/events/ocean-beach/teens-trails)

**Description**  
Participants/volunteers of Teens on Trails work on tasks, such as resurfacing trails, restoring native habitats, repairing fences, and cutting back brush along the trails. The goals of the program are to connect youth with trails, get youth involved in local trails, and allow youth to make connections with others who share similar interests. The program meets monthly.

**Organization responsible for program management**  
Golden Gate National Parks

**Location**  
California

**Years in existence**  
2005–present (15 years)

**Priority population**  
Middle and high school students

**Length**  
Ongoing

**Program reach**  
205 youth volunteers in 2017

**Measures of program impact**  
Number of completed projects

**Evaluation Data/Findings**  
In 2017, there were 205 youth leaders (middle and high school students). 41% of total service hours contributed were by interns and youth. More information on volunteer accomplishments can be found [here](https://www.parksconservancy.org/events/ocean-beach/teens-trails).
### Kids in Parks

**Description**

Kids in Parks is an expanding network of family-friendly outdoor adventures called TRACK Trails. Each TRACK Trail features self-guided brochures and signs that turn the visit into a fun and exciting outdoors experience. Children register for individual accounts, participate in self-guided trail hikes, and fill out an online adventure journal to receive prizes, which include stickers, nature journals, a bandana, magnifying glass, backpack, disc golf, and more.

**Organization responsible for program management**

Kids in Parks (KIP)

**Location**


**Years in existence**

2009–present (11 years)

**Priority population**

Youth under 18 years old

**Length**

Ongoing

**Program reach**

In 2020, 130,000+ adventures were completed by kids, reaching an estimated 48,100 youth.

**Measures of program impact**

Website registration captures: when activity took place, with who, age, preferences, activity levels, visitation, and enjoyment. The program has also worked with several universities on various research studies related to the program.

**Evaluation Data/Findings**

53% of KIP registrants were first time visitors to the park. 51% intentionally visited the park to hike the TRACK trail. 47% returned for a second adventure. 78% of returnees visited more than one TRACK trail.

### Transit to Parks and Trails

**Description**

Transit to Parks and Trails is a coalition program that works with local communities and local elected officials on providing more connections, via public transit, to parks and open green spaces for Angelenos, especially for those in park-poor neighborhoods. The program prioritizes parks in identified communities of interest. Main indicators used were health disadvantage index, department of water resources, SB535 Cal Enviro Screen, and Park Need Focus areas. In addition to these data points, the communities of interest also include areas of higher percentages of seniors, youth, rates of obesity, and communities of color.

**Organization responsible for program management**

LA Nature For All

**Location**

Los Angeles, California area

**Years in existence**

2016–present (4 years)

**Priority population**

Los Angeles residents in park-poor neighborhoods

**Length**

Ongoing

**Program reach**

There were two pilot shuttles, which have since closed. The Fish Canyon Falls Shuttle had 140 riders in June 2016. The Chantry Flat Shuttle had 842 rides over 3 weekends from September–October 2016. LA Nature For All has several routes proposed in the San Gabriel Mountains area, which will provide access for over 3/4 million residents in severely disadvantaged communities. Due to COVID-19, the program has been temporarily paused.

**Measures of program impact**

Surveys including questions about previous visitation of the forest/national monument, increased accessibility for users, by resident zip codes

**Evaluation Data/Findings**

The program pilot in Chantry Flat showed that 94% were highly satisfied with the trails and amenities. 90% said they would be willing to pay a small free for the shuttle, and many expressed a need and demand for the shuttle to be permanent.
### Youth Volunteer Vacations

**Description**
Washington Trail Association’s Youth Volunteer Vacations Programs are opportunities for youth ages 14-18 to spend time outdoors building and maintaining hiking trails in a safe, teamwork-oriented environment. Outdoor Leadership Training is also offered to teachers and youth leaders. Youth will spend one-week camping and working on trails to improve hiking trails, develop leadership and outdoor skills, make new friends, and explore the outdoors. There are three trip options available: one for beginners to experience projects near the ocean and in the mountains, one for those with at least 5 days of trail work completed requiring participants to hike to a basecamp and live there for a week to grow their trail and leadership skills, and one to foster strong positive identities such as All Latina Crew, All Girls Crew, and an LGBTQ+ Crew.

<table>
<thead>
<tr>
<th>Organization responsible for program management</th>
<th>Washington Trail Association</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location</td>
<td>Across Washington state</td>
</tr>
<tr>
<td>Years in existence</td>
<td>2007–present (13 years); pilot year in 2006</td>
</tr>
<tr>
<td>Priority population</td>
<td>Youth aged 14–18 years old</td>
</tr>
<tr>
<td>Length</td>
<td>One-week programs from July-August</td>
</tr>
<tr>
<td>Program reach</td>
<td>About 180 youth participate each year on average</td>
</tr>
<tr>
<td>Measures of program impact</td>
<td>2 surveys administered—one 3-question survey that asks about specific behaviors the participants observed in others that made them feel welcome or unwelcome and how to improve future experiences and one survey that is administered about the participants’ experience in general.</td>
</tr>
<tr>
<td>Evaluation Data/Findings</td>
<td>Demographic data is collected (race, gender, sexual orientation, and ability/disability, age)</td>
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### Week-Long Expeditions

**Description**
This Week-Long Expeditions wilderness mentoring program gives under-resourced youth an opportunity to experience both the beauty and challenges that the wilderness has to offer. Alongside supportive adult mentors, teens from under-resourced areas are taken out of their comfort zones and taught important life skills proven to positively impact their futures. During the week-long program, youth are outfitted with gear, hike out to the backcountry, spend three days in the backcountry doing various activities and challenges, and then hike back to the camp location.

<table>
<thead>
<tr>
<th>Organization responsible for program management</th>
<th>Big City Mountaineers</th>
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</thead>
<tbody>
<tr>
<td>Location</td>
<td>San Francisco, California; Denver, Colorado; Miami, Florida; Boston, Massachusetts; Minneapolis, Minnesota; Portland, Oregon; Seattle, Washington</td>
</tr>
<tr>
<td>Years in existence</td>
<td>1990–present (30 years)</td>
</tr>
<tr>
<td>Priority population</td>
<td>Youth from under-resourced areas</td>
</tr>
<tr>
<td>Length</td>
<td>Multiple one-week programs</td>
</tr>
<tr>
<td>Program reach</td>
<td>In 2019, 600+ students were reached.</td>
</tr>
<tr>
<td>Measures of program impact</td>
<td>Utilizes the 40 Developmental Asset Profile assessment; takes pre- and post-trip surveys of their students to determine the program’s impact on the children. See below for the type of information the Profile provides.</td>
</tr>
<tr>
<td>Evaluation Data/Findings</td>
<td>This program has had the greatest impact on positive values (integrity, honesty, responsibility, and avoiding alcohol, tobacco, and drugs), social competencies (decision-making, conflict resolution, building friendships, and avoiding negative peer pressures), and positive identity (self-esteem, purpose, and positive view). In 2019, there were 55 week-long expedition and overnight camps offered, 2,877 youth program days, and 600+ youth participants engaged.</td>
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*Table 1 continued.*
References


**Acknowledgments**

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