EXECUTIVE SUMMARY

Evaluation of FIRST LEGO® LEAGUE UNDERSERVED INITIATIVE

Prepared by:

Alan Melchior, Tracy Cutter, Faye Cohen
Center for Youth and Communities
Heller School for Social Policy and Management
Brandeis University
Waltham, MA

Prepared for:

U.S. FIRST
Manchester, NH

August 2005

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Background

In 2004-2005, the FIRST LEGO® League (FLL) program undertook several initiatives aimed at increasing the involvement of young people from urban and low income ("underserved") schools and communities in FLL. Collectively known as the "FLL Underserved Initiative," these special program efforts included: (a) direct grants (to cover registration fees and other costs) to approximately 45 teams in underserved communities, recruited by state and regional FLL operating partners; (b) a national partnership with Boys and Girls Club of America (BGCA) to sponsor and support 45 FLL teams; and (c) a pilot effort with the Houston (Texas) YMCA to sponsor up to 10 teams. In each case, the goal of the effort was to explore new ways of expanding the FLL program to better serve "underserved" youth.[1]

The FLL Underserved Initiative evaluation was designed to assess the implementation and effectiveness of the Underserved Initiative and to begin to identify best practices and "lessons learned" that FIRST could use in strengthening its efforts to expand into more urban and low income communities. In late 2004, FLL contracted with the Center for Youth and Communities at Brandeis University's Heller School for Social Policy and Management to conduct the evaluation, building on the Center's assessment of the FLL program conducted during the 2003-2004 competition and using many of the same basic survey protocols and data collection processes so that, where possible, comparisons could be made between the results of the regular FLL (2003) and the FLL Underserved (2004) studies.[2] Several basic questions guided the 2004 FLL Underserved Initiative Study.

1. To what extent was the FLL program able to successfully expand participation of urban and low income youth through the various grant programs and its work with community-based intermediaries such as the Boys and Girls Clubs of America (BGCA) and the YMCA?

2. What was the impact of the FIRST LEGO® League program on participating young people in the various programs in the Underserved Initiative?

3. To what extent was FLL able to successfully engage adults in support of the FLL teams in underserved communities?

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[1] At the time of the Initiative, the term "underserved" was undefined, though generally understood to mean schools serving predominantly low income and minority youth. Since that time, FIRST has been moving towards a more formal definition of the target audience for its "underserved" initiatives, with an emphasis on organizations serving predominantly low income youth (50% or more of an organization's youth eligible for the federal free or reduced cost lunch program).

[2] Throughout this paper, the initial study of the FLL program that took place during the 2003-2004 competition season will be referred to as the "2003 FLL study" or the "2003 study." The FLL Underserved Initiative study conducted during the 2004-2005 competition season will be referred to as the "2004 FLL Underserved Study" or the "2004 study."

Methodology and Data Collection

To address these questions, the evaluation design called for the collection of two major types of data: (1) surveys of team members, coaches and parents in teams funded through the FLL Underserved Initiative, as well as a sample of teams in underserved communities that did not receive funding, and (2) telephone interviews with team leaders from a sample of teams in the study. The original goal was to collect data from all of the teams in the FLL Underserved Initiative in order to have a sufficiently large sample to look at differences between the various Initiative efforts (BGCA, YMCA, direct grants), and to have a sufficiently large sample of non-Initiative teams to provide a point of comparison. In the end, however, survey packages were returned by only 26%-30% of the teams, limiting some of the analyses and making it necessary to treat the findings with a substantial degree of caution. While the data can be seen as providing an initial assessment of the experience of teams involved in this year's FLL Underserved Initiative and can provide useful information for planning and program design, the findings on program effectiveness should be confirmed through other sources or additional research.

Key Findings

While recognizing the limitations of the data, the findings from the surveys and interviews generally indicate that the FLL Underserved Initiative was successful in expanding access to the FLL program to a more diverse group of young people in low income and minority communities; that the teams were able to provide participating youth with a high quality experience; and that the programs in the FLL Underserved Initiative were able to produce participant impacts that were comparable to those of the broader population of FLL teams, based on the data from the 2003 FLL study.

The results can also be placed into the larger context of effective youth development programs. For example, respondents were asked to assess aspects of FLL that are typically viewed as necessary components of programs designed to promote positive youth development, such as supportive relationships and opportunities for skill building[3]. The results show that the FLL experience in both the 2004 Underserved Initiative sites, and the broader group of 2003 FLL teams, provide the large majority of participants with the kinds of experiences that are recommended by the research on positive youth development. In that regard, the assessments of the FLL participants in both 2004 and 2003 not only reflect a positive overall assessment of the program, but help to show the relationship between FLL and a broader body of research on effective programs for young people.

Despite their positive outcomes, teams in the Underserved Initiative did face challenges, particularly in recruiting coaches and mentors with technical expertise, gaining parent involvement, maintaining the attention and engagement of team members, and accessing advice and technical assistance. Two major recommendations emerge from those findings: the need to provide increased technical assistance and support materials from FIRST, particularly for first-time teams; and better efforts to promote and raise awareness of FLL, both for recruiting purposes and as a strategy for building parent support and involvement.

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[3] See Jacquelynne Eccles and Jennifer Appleton Gootman, Editors, *Community Programs to Promote Youth Development* (National Research Council and Institute of Medicine, 2002).

Finally, what came through in interviews with FLL coaches and in the survey responses was the understanding that the challenges involved in creating and sustaining FLL teams in underserved communities were real and often difficult to overcome, but not insurmountable. The large majority of FLL coaches responding to surveys planned to return to FLL next year, and most had practical ideas and suggestions on how to make the process easier on the coaches that followed. Similarly, while most coaches agreed that the availability of grants made a difference in bringing new teams into FLL, they also reported that most teams expected to be able to generate their own support and sustain their involvement over time. In that regard – that it helped to establish new teams serving new populations, with a high degree of commitment from coaches to continue -- the FLL Underserved Initiative was successful in meeting its fundamental goals.

Some of the Specific Findings from the Evaluation are as Follows:

- Through its targeted efforts, the Underserved Initiative was able to reach a more diverse population than is typically served by FLL, with a large proportion of teams operated by first-year coaches (nearly 70%). Team members in the Initiative were substantially more likely to be first-time participants and from low income backgrounds when compared with the 2003 national sample of FLL teams. The Underserved sample included more young people from minority backgrounds, particularly African-Americans (23% of participants vs. 3.1% in 2003) and Hispanics (16.7% vs. 5.3% in 2003). The Underserved sample had a higher proportion of teams from urban (46.9% vs. 21.4%) and rural (25.0% vs. 18.2%) locations. Coaches in the Initiative were also more diverse, with higher proportions of African-Americans and Hispanics, and a higher proportion of female coaches.

- Teams in the Underserved Initiative in 2004 did differ from the average 2003 FLL team in some important ways. In general, the 2004 teams were less likely to have coaches with technical expertise (39.4% vs. 67.6%), less likely to have parental involvement and support (42.4% vs. 60.5%), and less likely to work on the research project (69.7% vs. 96.9%). Also, probably as a result of the different methods used to recruit the 2003 and 2004 teams into the evaluation, the 2004 teams differed from the 2003 teams in that these teams had not attended tournaments as widely as the 2003 sample had (72.4% vs. 97.9%). Differences between the samples were reflected in the outcomes, where, for example, teams in the 2004 Initiative were less likely to report positive outcomes in the areas related to tournament participation than their 2003 counterparts (i.e., making a presentation using charts, graphs, etc.). To some degree, these kinds of differences may reflect the late start-up experienced by many of the teams in the Underserved Initiative. However, they also point to areas where new Underserved teams are likely to need additional support and assistance from FIRST.

- Fewer parents in the 2004 sample reported high levels of involvement (5.1% v. 24.2%) with their child's team. As a group, fewer parents had a technical background (16.3% vs.37.2%) and a lower percentage were familiar with the FIRST Robotics Competition (20.4% vs. 58.9%). It could be that at least some of the lower level of parental involvement is due to the high proportion of rookie teams in the 2004 sample.

- Despite some operational differences (i.e., tournament participation), coaches in both the 2003 and 2004 samples reported many similarities in how they used their time in FLL and on which activities they focused. Coaches in both groups emphasized the development of leadership and teamwork skills and a sense of team identity, problem-solving strategies and an understanding of the importance of helping others. The 2004 coaches, however, were more likely to place an emphasis on the importance of doing well in school with the team members (90.9% vs. 76.2%), on familiarizing team members with careers in science and technology (72.7% vs. 61.9%), and on developing basic math skills (72.7% vs. 65.8%).

Participant Outcomes

- In all three sets of surveys (participants, parents, and coaches), the majority of respondents in 2004 saw increased interest in science and technology among program participants, with the most frequently reported participant gains in interest in computers and technology and how science and technology are used in the real world.

- As with the data on interests, large majorities of coaches, participants and parents report participant gains in the knowledge, practical skills, and attitudes associated with FLL, with over 75% of the FLL coaches reporting participant gains in almost every area and 80% or more of participants reporting gains on most measures as well. A majority of parents also reported participant gains in knowledge, skills and attitudes.

- In general, the results from 2004 were similar to those for the teams in the 2003 study, though a number of differences are worth noting. Substantially fewer coaches noted gains in research-related skills in 2004 than in 2003 (75.7% in 2004 vs. 83.8% in 2003), likely reflecting the lower participation in the tournaments and research projects; and participants were also less likely to report gains in presentation skills (75.8% vs. 91.2%). On the other hand, coaches in 2004 were substantially more likely to report gains on basic math skills (75% vs. 58.5%) for team members (also noted by parents), and program participants were significantly more likely to report gains in their writing skills (63.8% vs. 50.6%). Finally, participants in 2004 were significantly more likely to report wanting to solve problems in their community as a result of FLL (91.2% vs. 83.7%), but were less inclined to want to pursue a career in science or engineering (45.2% vs. 58.7%).

- The large majority of participants who were involved in other after-school activities felt that FLL had at least a comparable impact to the other programs, with a substantial portion (36% to 48%) reporting a greater impact from FLL. The parent data showed similar results, with most parents feeling that FLL had had at least the same level of impact on their child as other programs, and with 32%-43% feeling that it had more of an impact. For both participants and parents, FLL was seen as most likely to have a greater impact in teaching cooperation and teamwork, with just under half of the participants also reporting an impact on their sense of self-confidence.

- Most participants in the 2004 Underserved Initiative teams rated their FLL experience positively, with a large majority of participants indicating an interest in returning to the

program the following year. Overall, 86% of the 2004 participants rated their experience in FLL as either 'Excellent' or 'Good,' and 81% indicated that they expected to return the following year. However, participants in the 2003 programs were significantly more likely than the participants in the 2004 teams to rate their program experience as "Excellent," though the proportion of participants interested in continuing in FLL was virtually identical.

Challenges Faced by Teams and Recommendations for Improving

- Though the outcomes were generally positive, the 2004 pilot also served to highlight some of the barriers faced by teams in the Underserved Initiative and several areas in which program improvements could be made. As staff at FIRST have acknowledged, implementation of the Underserved Initiative's grant program needs to be strengthened, with clearer definitions of eligibility for the grants, and stronger expectations for and tracking of organizations and teams receiving grants. Similarly, agreements with intermediary organizations need to be spelled out and better strategies for follow-up with those groups should be implemented.

- At the program level, key challenges included those of recruiting coaches and mentors with technical expertise; gaining parent involvement; maintaining the attention and engagement of team members; and accessing advice and technical assistance.

- Coaches and parents had a variety of comments and suggestions regarding these and other challenges, which point towards several practical steps that FIRST can take to better support teams in underserved communities. Two major recommendations in particular stand out: increased technical assistance and support materials from FIRST, particularly for first-time teams (video-based resources and better mechanisms for linking rookie and experienced teams were a strong priority); and better efforts to promote and raise awareness of FLL, both for recruiting purposes and as a strategy for building parent support and other community involvement. Specifically, the development and distribution of materials would assist coaches in setting up and operating their teams, and could also be used in promoting FLL locally (to parents, sponsors, schools). Individual support, such as coach mentoring, was cited as a way to help teams, especially those headed by new coaches, establish and sustain themselves. Having the support of both national staff from organizations such as BGCA and FIRST, as well as coworkers at their local clubs and organizations was seen as an asset to teams.

- Finally, what came through in interviews with FLL coaches and in the survey responses was the understanding that the challenges involved in creating and sustaining FLL teams in underserved communities were real and often difficult to overcome, but not insurmountable. The large majority of FLL coaches responding to surveys planned to return to FLL next year, and most had practical ideas and suggestions on how to make the process easier on the coaches that followed. Similarly, while most coaches agreed that the availability of grants made a difference in bringing new teams into FLL, they also reported that most teams expected to be able to generate their own support and sustain their involvement over time. In that regard – that it helped to establish new teams serving new populations, with a high

degree of commitment from coaches to continue - the FLL Underserved Initiatives was successful in meeting its fundamental goals, at least as can be surmised from those participants who responded to the survey.

Conclusion

The recent efforts that FIRST made to promote FLL in underserved communities were largely a success. The Underserved Initiative did meet its goal of recruiting teams from minority and low income backgrounds. While some teams did appear to experience the program differently - having less exposure to the various components of the program (tournaments, research project), less parental assistance, and less technically skilled coaches - the participant outcomes were quite similar to those from the broader 2003 study. Though many of these teams faced challenges, the results from this small sample of teams reveal that FLL can successfully establish teams in underserved communities, provide a positive experience for team members, and thus inspire interest in and understanding of science and technology throughout a wider group of young people than it has reached in past years.