SPY HOP PRODUCTIONS
EDUCATION DATA ANALYSES

FEBRUARY 2016

Introduction

Spy Hop Productions asked the Utah Education Policy Center (UEPC) to conduct longitudinal analyses to explore the relationship of Spy Hop participation and educational outcomes. This report provides an explanation of the methods used for the analyses and a summary of the findings.

Methods

The research questions that guided the analyses were: 1) what were the characteristics of Spy Hop participants and 2) was there a relationship between participation in Spy Hop and selected outcomes? If so, for whom? UEPC evaluators used descriptive statistics to answer the first research question. For the second research question, UEPC evaluators conducted two analyses. One was an analysis of high school test scores and the other was an analysis of high school completions codes (normal graduation, formal dropout, etc.). The purpose of analyzing test scores was to determine whether Spy Hop participation was associated with changes in standardized test scores over time, and if so, in which academic subjects. The purpose of analyzing high school completion codes was to determine whether Spy Hop participation was associated with increased or decreased rates of high school graduation or dropout, relative to Salt Lake County averages during the same years.

Participants

Spy Hop provided UEPC evaluators with participation data for 2,301 youth who participated in Spy Hop between July 2010 and December 2013. The participation data were merged with participant education data.[1] The merging process linked data for approximately 70% (1,591) of the Spy Hop participants. The percentage of participants from each program that matched to the education data are presented in Table 1.

Table 1. Percent of Spy Hop Participants Matched to Database by Program

Program	Percent that matched
Community Partnerships	73%
Loud and Clear	57%
Multimedia Apprenticeship	52%
Open Mic	72%
Pitchnic	58%
Seasonal Programs	86%
U of U Summer Programs	83%
Sparks Spy Hop Jr.	77%
Youth Documentary Arts	46%

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[1] Data for this research was accessible through Utah's state longitudinal data system database administered by the Utah Data Alliance (UDA), which includes data supplied by UDA partners and the StudentTracker service from the National Student Clearinghouse. This research including the methods, results, and conclusions neither necessarily reflect the views nor are endorsed by the UDA partners. All errors are the responsibility of the author. For more information, please visit www.UtahDataAlliance.org.

Although not all Spy Hop participants matched with education data, and match rates varied across programs, the median number of hours of participation (12), the median age at first participation (15), and percent of male participants (68%) were the same for all Spy Hop participants and for the subset of participants who could be matched with education data. The similarities in programmatic and demographic data suggest that the sample of participants who could be matched with education data was representative of the larger population of Spy Hop participants.

Of the 1,591 students for whom participation data and education data could be linked, 1,425 students had scores from standardized tests. This subset of 1,425 students were considered for the analysis of standardized test scores. Similarly, of the 1,591 students that could be matched, 581 Spy Hop participants had high school completion codes, indicating that they had exited high school between fall semester of 2011 and spring semester of 2013. This subset of 581 students were considered for the analysis of high school completion codes.

Outcome measures

For the analysis of test scores, the outcomes were students' scores on Utah's year-end standardized Criterion Reference Tests (CRTs) including English language arts (ELA), mathematics, and science tests. CRT scores range from 130 to 190 points, with a standardized average score of 160 and a standard deviation of 10. CRT tests have recently been replaced by a new set of tests (Student Assessment of Growth and Excellence or SAGE) aligned to the new Utah Core Standards.

For the analysis of high school completion, outcomes were final high school completion codes of students who participated in Spy Hop during high school. Federal graduation codes from 2013 were used to determine which codes were counted as graduates, non-graduates, or excluded from analysis.[2]

Analytical Approach

The test score analyses used CRT scores that were coded as having been obtained *before*, *during*, or *after* the academic year in which students first participated in Spy Hop. This allowed researchers to look for changes in test scores over time, and the academic subjects in which scores changed. Data were analyzed with five different models, some of which included student characteristics such as English language learner status, age, and eligibility for free or reduced lunch as covariates. The models are listed below:

1. **All Spy Hop participants and no covariates;**
2. All Spy Hop participants with age, English learner (EL) status, eligibility for free and reduced lunch, and hours of Spy Hop participation statistically controlled;
3. All participants with CRT tests prior to participation coded as low or high proficiency and used as a between subject predictor;
4. Only participants from the multi-media apprenticeship, Loud and Clear, Pitchnic, or Youth Documentary programs with no covariates; and
5. **Only participants from multi-media apprenticeship, Load and Clear, Pitchnic, or Youth Documentary Programs with age, EL status, and eligibility for free or reduced lunch statistically controlled.**

All five analysis of variance models described above were analyzed with both fully repeated measures and quasi-repeated measures designs. For the fully repeated measures designs, observations for each student in the analysis were required at each of nine measurement points (i.e., ELA, math, and science scores were required before, during, and after Spy Hop participation). For the quasi-repeated measures

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[2] Federal graduation codes can be found here: www.schools.utah.gov/data/Reports/Graduation-Dropout/Codes.aspx

designs, students included in the analysis might not have had data in all nine measurement points. Results were similar across all analytical models. As such, only results from models 1 (fully repeated) and 5 (quasi-repeated) above are included in this document.

Due to the small sample size of Spy Hop participants who had exited high school, the completion code analysis was not able to take student demographics into account. Percentages of students who participated in Spy Hop prior to exiting high school and who had high school completion codes indicating graduation or non-graduation were compared to statewide percentages for the same exit codes. Z-tests of proportions were used to compare the graduation outcomes of Spy Hop participants to statewide graduation outcomes.

Findings

What were the characteristics of Spy Hop participants?

Demographic data for the 1,591 students who matched with participant education data showed the following:

- 46% of Spy Hop participants were students of color,
- 59% qualified for free or reduced lunch during at least one academic year,
- 24% qualified for English learner services during at least one academic year,
- 71% were proficient on standardized English tests across included years,
- 58% were proficient on standardized mathematics tests,
- 55% were proficient on standardized science tests,
- 72% had been chronically absent (i.e., missed school for 10% or more of the days enrolled) during at least one academic year,
- 11% enrolled in Advanced Placement (AP) courses while in high school, and
- 28% enrolled in higher education courses after graduating from high school.

Were there relationships between participation in Spy Hop programs and selected outcomes?

As described above, multiple analyses were conducted on CRT scores of Spy Hop participants. Results were consistently similar across all analyses and showed that, on average:

- Participants performed better on standardized tests taken prior to participation than they did on tests taken after participation;
- Participants performed better in ELA than they did in math or science; and
- Changes over time were different for each subject area:
  - ELA scores remained approximately the same over time;
  - Science scores decreased over time, in some analyses the decreases were statistically significant and in others they were not;
  - Math scores decreased significantly in all analyses.

Results for all Spy Hop programs in the no covariates, fully repeated measures design

This analysis included Spy Hop participants who had test scores from all nine observation conditions. Although only 349 of the possible 1,425 students met this criterion, this design offered a precise measure of change for those students. Results showed significant changes over time, significant differences across subject areas, and that each academic subject area changed differently over time. A depiction of test scores for students tested before, during, and after Spy Hop participation is shown in Figure 1.

Figure 1. Results from the repeated observations, no covariates model
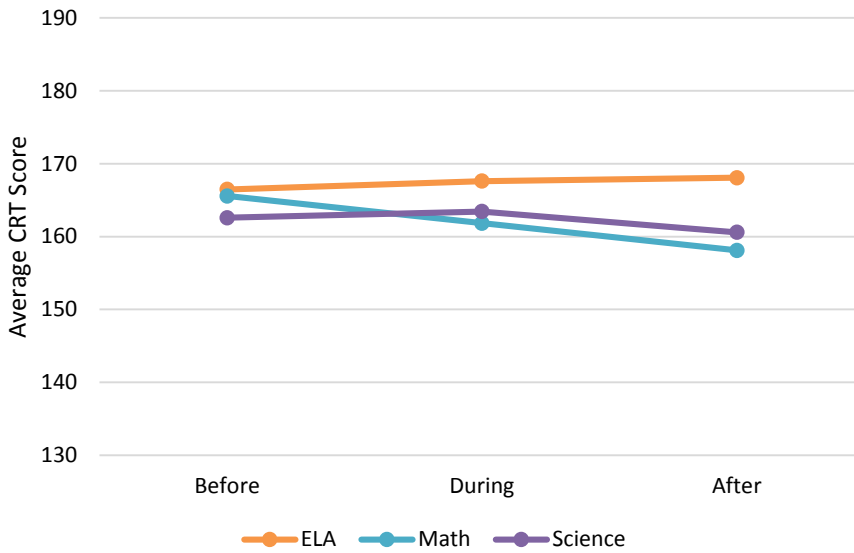
Results from the high dosage program only, all covariates, quasi-repeated measures design

To be included in this analysis, students had to participate in a high dosage Spy Hop program (i.e., Loud and Clear, Pitchnic, Multi-Media Apprenticeship, or Youth Documentary). Youth who participated in these programs were recorded as having participated an average of 184 hours each. Although students in this analysis were required to have test scores before, during, and after Spy Hop, they were not required to have test scores in each tested subject at each time point. As such, the number of observations were variable across conditions (see Table 2).

Table 2. Number of observations in each condition.

Observation Condition	Number of Observations
Before Spy Hop	584
During Spy Hop	281
After Spy Hop	202
ELA tests	376
Math tests	319
Science tests	372

Similar to the other analyses (see Figure 1), the results from this analysis showed significant changes in test scores over time, significant differences across subject areas, and that the different subject areas changed differently over time. A depiction of test scores for students tested before, during, and after the first year of Spy Hop participation is shown in Figure 2.

Figure 2. Results from the high dosage programs, no covariates model.
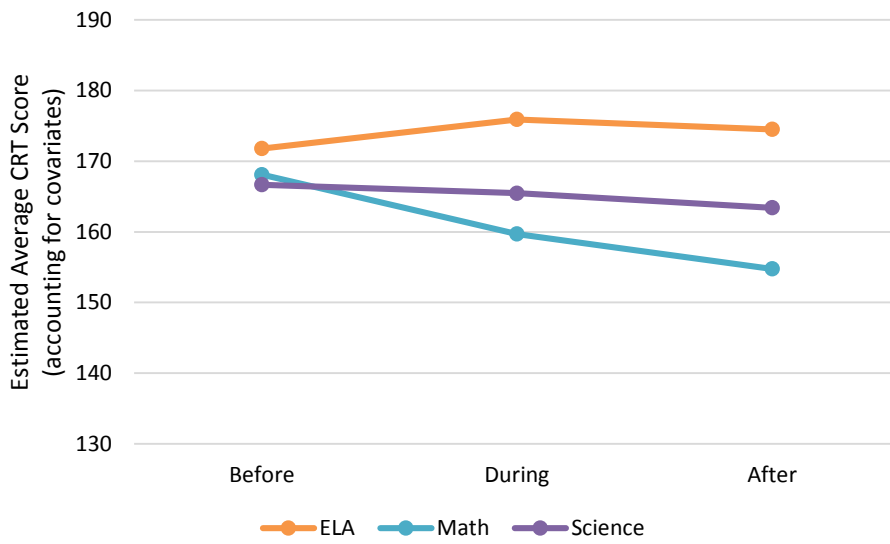
Analysis of High School Completion Codes

Although 581 Spy Hop participants had high school completion codes, only 346 of the students participated in Spy Hop while in high school. Fewer students still (76) participated in high dosage Spy Hop programs while in high school. Table 3 provides comparisons of percentages of graduates for all 581 Spy Hop participants, for the 346 student who participated in Spy Hop during high school, and for the 76 students who participated in high dosage programs while in high school. The statewide average for all Salt Lake County students[3] who exited high school between fall semester 2011 and spring semester 2013 is also provided.

Table 3. Completion code frequencies for Spy Hop participants.

High School Graduates	Graduation Rates
All Spy Hop participants (N=581)	63%
High school participants (N=346)	66%
High dosage high school participants (N=76)	79%
Salt Lake County average (N=104,515)	67%

The "high dosage high school participants" appear to have a higher graduation rate than the other Spy Hop participants or the Salt Lake County average. These results should be interpreted cautiously because this analysis does not take into account the expected rates of graduation for the various groups based on demographic and other student variables. These results do not indicate that high dosage participation in Spy Hop increases the likelihood of high school graduation.

Summary of Results

Approximately 1,425 Spy Hop participants from July 2010 to December 2013 could be matched with education data including CRT test scores, and 581 could be matched with high school completion codes. Students who could be matched were similar to the total population of Spy Hop participants during this time.

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[3] 85% of the 581 Spy Hop students with graduation codes came from school districts in Salt Lake County.

Five models predicting CRT scores for English Language Arts, mathematics, and science were analyzed using the matched sample. These models included simple relationships between Spy Hop participation and test scores as well as relationships that took demographic and participation data (dosage) into account. The analyses of all five models found similar results, whether the model designs were fully repeated measures (only participants with all data points were included) or quasi-repeated measures (missing data points were allowed). On average,

- Participants performed better on standardized tests taken prior to participation than they did on tests taken after participation;
- Participants performed better in ELA than they did in math or science; and
- Changes over time were different for each subject area:
    - The ELA scores remained approximately the same over time;
    - Science scores decreased over time, in some analyses the decreases were statistically significant and in others they were not;
    - Math scores decreased significantly in all analyses.

The analyses of high school completion codes must be interpreted cautiously, but they show a higher rate of graduation among high dosage participants than lower dosage participants. This increased graduation rate should not be attributed to Spy Hop because we do not know the rate at which those students would have been expected to graduate from high school based on other predictor variables.