

Junior Rocket Owls

Academic Year: 2015 - 2016



Program Evaluation

Performed by:

Lucia Riderer, Ed.D.

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Executive Summary

A program evaluation was conducted to assess the 2015-2016 Junior Rocket Owls program at Citrus College. The Junior Rocket Owls program is a year-long outreach program designed and facilitated by Citrus College physics faculty and students for 5th grade students enrolled in the Glendora Unified School District (GUSD). This program was conducted with participating students from the five GUSD elementary schools. Out of the 30 students who enrolled in the program initially, 25 completed the program successfully. The program's main goals were to increase young students' interest in math, science and technology, enhance their teamwork and communication skills and provide them with new knowledge of math and science rocketry-related concepts. The evaluation model used to assess the Junior Rocket Owls program was a Context, Input, Process, and Product Program Evaluation model that addressed the following evaluative aspects: concerns addressed by the program; what strategies were implemented and why; which resources were utilized; and whether participation resulted in gaining skills that could help partakers in their future academic endeavors and careers. Quantitative and qualitative data was collected via surveys and interviews, and analyzed to determine the impact that participation in the program had on the participants. The findings showed that in general the program was successful. Participating students reported an increased interest in technology, along with an enjoyable experience in the program and gain of new math and science rocketry-related knowledge. Areas of concern include program sustainability due to uncertain funding and parent commitment to ensure sustained and timely participation of the children in the program activities, along with managing occasional disruptive behavior of participating 5th grade students.

Introduction

Program evaluation is an essential tool in the field of educational improvement (Roybal, 2011). In order for a program evaluation to be effective, it must accomplish two significant things: substantiate progress made and identify areas for sustained improvement (Jason, 2008). One evaluation model identified by Stufflebeam, Madaus, and Kellaghan (2000) to be effective in an educational environment is the improvement and accountability model intended to be able to prove a program's merit based on assessing the needs of the stakeholders as well as the outcome indicators. This type of evaluation is a summative assessment designed to determine the overall quality of a program and measure the program's performance in terms of its outcomes (Scriven, 1991; Bamberger, Rugh, & Mabry, 2012)

This narrative is the report of the summative evaluation based on an improvement and accountability approach of the Junior Rocket Owls Program at Citrus College.

Evaluation Model

Stufflebeam's (2003) Context, Input, Process, and Product (CIPP) Program Evaluation model was used to design the summative evaluation of the Junior Rocket Owls Program. This model is a well-established and widely used approach in evaluating educational programs (Guerra-Lopez, 2008; Roybal, 2011). The evaluator analyzed the Context, Input and Process components of the program to address the following aspects: concerns addressed by the program; what strategies were implemented and why; which resources were utilized; who were the participants. The Product component of the program was analyzed to determine whether program participation resulted in gaining skills that could help partakers in their future academic endeavors and careers.

Context

The main objective of the Context component of the CIPP model is to focus on the issues that the program is addressing. In this evaluation, the following question was addressed to help determine the Context:

What was the change in the level of students' interest in science, technology and enrolling in a High School Physics course as a result of participation in the Junior Rocket Owls program?

Data Collection and Findings

The data collected to answer the above question was comprised of answers provided by the participants to Likert-scaled survey administered to participating students before and after participating in the program. The data collected is presented in Appendix A.

In summary, the results indicated the following positive aspects, as a result of participation in the program:

- a high increase in the percentage of students reporting a *strong agreement* that technology is fun (from **69%** before participation to **91%** after participation in the Jr. Rocket Owls program)
- a slight increase in the percentage of students reporting a *strong agreement* that technology is interesting (from **72%** before participation to **74%** after participation in the Jr. Rocket Owls program)
- a moderate increase in the percentage of students reporting a *strong agreement* that they would take Physics in High School, if given the choice (from **14%** before participation to **23%** after participation in the Jr. Rocket Owls program)

In addition to the above enhancements, the survey data also showed that students' interest in science has not been enhanced by participating in the Junior Rocket Owls program. About the same percentage of participating 5th grade students reported a *strong agreement that science is interesting and fun* before and after participation in the Jr. Rocket Owls program (79% before and 78% after participation found science to be interesting, while 79% before and 74% after participation found science to be fun).

Input

The Input component of the CIPP evaluation model involves an examination of the program's activities along with the resources utilized in the development of those activities. The guiding evaluation questions for the Input component of the program were:

1. *What were the strategies used for program execution and why?*
2. *What resources were employed in the development and implementation of the Junior Rocket Owls program?*

Data Collection and Findings

In order to answer the first Input question, the evaluator collected data containing information related to the program's activities. The data collected revealed the information shown in Table 1 below.

Table 1
Program Strategies

Strategy	Value
Hands-on rocketry projects	Increase students' interest in and practical knowledge of science and enhance their teamwork skills and self-efficacy.
Interactive presentations on rocketry topics	Increase students' awareness and theoretical knowledge of rocketry-related topics and help them understand the importance to pursue a career in STEM.

The data collected to address the second Input question, is shown in Table 2 below.

Table 2

Program Resources

Resource	Description
Citrus College facilities Materials and supplies	Physics and Computer labs Funds received from the Glendora Education Foundation along with a California Space Consortium grant awarded to Dr. Riderer and private donations from Popla Inc., the Citrus Owls Bookshop and Glendora Papa John's Pizza.
Citrus College staff and number of contribution hours	Citrus Physics faculty (Dr. Riderer, 60 hours) and various clerical, IT, and Campus Safety Citrus staff (6 hours)
Citrus College Students and number of contribution hours per student	Citrus Research in Science and Engineering (RISE) team members (15 students; 60 hours per student)

Process

The Process component of the CIPP evaluation is an “ongoing check on a plan’s implementation plus documentation of the process, including changes in the plan as well as key omissions and/or poor execution of certain procedures” (Stufflebeam, 2000, p. 294). The evaluator designed this evaluation component to examine whether the execution process of the Junior Rocket Owls program was executed with fidelity. The following question related to Process was addressed:

What were the factors affecting the execution of the program’s strategies?

Data Collection and Results

The qualitative data collected via interviews with the participants’ parents and the college students who facilitated the Junior Rocket Owls meetings to address the Process question

disclosed the following factors that had a positive impact on the successful implementation of the program's strategies:

- adequate resources, including facilities and monetary funds
- young students' and their parents' willingness to partake in the experience
- college students' and faculty's enthusiasm and commitment to provide a positive experience for the 5th graders

In addition, the data collected also revealed the following factors that had a negative impact on the successful implementation of the program:

- disruptive behavior of some participating students (i.e. excessive talking during presentations, refusing to participate, not paying attention, etc.)
- some parents' failure to ensure their child's participation in all sessions
- some parents' failure to ensure that their child comes prepared to the monthly meetings (i.e. did his/her homework, has brought all necessary supplies, etc.)
- some parents' failure to ensure their child's comes to the monthly sessions in time to begin the activities together with the rest of the participants

All interviewees believed that, overall, the program was executed successfully. However, they expressed concerns related to the program sustainability. The main themes that emerged regarding program sustainability were the uncertainty of future funding along with the commitment of participating students' parents to ensure that their children participate in all activities of future programs and come to Citrus College prepared for the monthly activities.

Product

The Product part of the Junior Rocket Owls program's evaluation was designed to allow the evaluator to collect data in order to determine the effectiveness of the program in terms of

meeting the needs of the participants. This aspect of the evaluation was intended to “focus on assessing program results, based on participant learning” (McNeil, 2011, p.24) by addressing the main question: “Has this program made a difference?” (The Evaluation Forum, 2002, p. 9)

More specifically, the question asked was

How did the students who participated in the program feel about their experience?

Data Collection and Results

In order to answer the above question, participants were asked to complete a survey asking to rank their experience in the program on a scale from 1 to 5 (with highest being *Excellent*, followed by *Very Good*, *Good*, *OK*, and *Not Good*). In addition, they were also asked what they liked *the most* and *the least* about the program.

The quantitative data collected using the survey is presented in Appendix B. In summary, this data showed that most of the students have had an *excellent* experience (**64%**), while **29%** had a *very good* experience and **7%** had a *good* experience while participating in the program. Additionally most of the students indicated that they enjoyed the most building and launching the rockets as well as learning about the physics of rocketry. Many students indicated that there was nothing that they enjoyed the least. However, some of the participating students indicated that they least enjoyed doing homework (their justification was that they already have to do homework for school, so they did not expect to have to do homework for this program) and waiting for late 5th grade students to be able to begin the monthly sessions. Some of the interviewed students also indicated that they believe that participation in the Junior Rocket Owls program will help them be more successful in middle school and high school, as well as choosing a career in STEM (several students showed an interest to work for NASA when they grow up).

Summary and Recommendations

The CIPP evaluation model allowed a summative evaluation to be conducted on the Junior Rocket Owls program at Citrus College, using the Context, Input, Process and Product components. In order to answer each component's key question(s), data was gathered using both qualitative and quantitative techniques. The qualitative data was examined for overarching themes, while the quantitative data was analyzed using descriptive statistics. Although most of the data collected were indicative of a successful program, conducted effectively, some of the data indicates areas of weakness. The concerns along with the evaluator's recommendations on how to address them are shown in Table 3, below.

Table 3

Concerns and Recommendations

Concern	Recommendation
Lack of funding	Consider private funding
Disruptive student behavior	Create and enforce behavior norms
Lack of commitment from parents	Interview all parents before accepting their children in the program
Deficient increase in student interest in science	Redesign some activities to be more attractive and student friendly (interactive presentations involving science concepts, such as Newton's Laws of Motion, Impulse and Momentum, etc.)

Conclusion

It is difficult to create a sustained outreach program for elementary school students at a community college for a variety of reasons, including the lack of resources. However, the findings outlined in this evaluation narrative prove that Citrus College is a very good environment for such a program. The Junior Rocket Owls program has forced the college's faculty and students to proactively and collaboratively seek ways to continually learn how to

generate opportunities to use their knowledge and enthusiasm to create a potent science, technology, engineering, and math (STEM) culture in the Glendora community.

The Program Director, Dr. Riderer, as well as the participating Citrus RISE students under Dr. Riderer's advisement would like to take this opportunity to thank the following generous sponsors of the Jr. Rocket Owls Program: Citrus College administrative personnel, who approved the creation and development of this program, along with use of the college's facilities for the monthly sessions as well as Citrus College staff members who helped with those facilities and the program in general; Glendora Unified School District administrative personnel and teachers who helped in the recruitment of the 5th grade participating students ; Glendora Education Foundation, Popla Inc. and California Space Grant Consortium, who provided the necessary funds to conduct the hands-on experiments during the 10-month program; Citrus College Owls Bookshop, who provided the school supplies, including bag packs, notebooks, pens, and geometry sets for the participating students, and Papa John's Pizza in Glendora, who provided the pizza for the monthly meetings.

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APENDIX A

STEM Attitudes (as Reported by 5th Grade Participating Students)

Junior Rocket Owls Pre-Program Survey

Question	Strongly Agree	Agree	Disagree	Strongly Disagree	
1	23	6	0	0	29
2	20	9	0	0	29
3	23	6	0	0	29
4	21	8	0	0	29
5	4	19	6	0	29
6	9	14	5	0	28

Question		%
1	Science is Fun	79
2	Technology is Fun	69
3	Science is Interesting	79
4	Technology is Interesting	72
5	Given a choice I will take Physics in High School	14
6	People to take Physics in High School are more likely to get higher paying jobs	32

Junior Rocket Owls Post-Program Survey

Question	Strongly Agree	Agree	Disagree	Strongly Disagree	
1	17	6	0	0	23
2	20	2	0	0	22
3	18	5	0	0	23
4	17	6	0	0	23
5	5	12	5	0	22
6	5	11	6	1	23

Question		%
1	Science is Fun	74
2	Technology is Fun	91
3	Science is Interesting	78
4	Technology is Interesting	74
5	Given a choice I will take Physics in High School	23
6	People to take Physics in High School are more likely to get higher paying jobs	22

APENDIX B

Program Experience (as Reported by 5th Grade Participating Students)

	Excellent	Very Good	Good	OK	Not Good	
	18	8	2	0	0	28
%	64.28571	28.571429	7.1429			

APENDIX C

Selected Program Photos





