The Journal of Extension

Volume 41 | Number 5 Article 22

10-1-2003

Estimation of Attendance at a Large Outdoor Event

Anne M. Streich
University of Nebraska, astreich2@unl.edu

David B. Marx
University of Nebraska, dmarx@unl.edu

Jeanette M. Stafford
University of Nebraska

Steven N. Rodie
University of Nebraska, snrodie@uomaha.edu

Recommended Citation

Streich, A. M., Marx, D. B., Stafford, J. M., & Rodie, S. N. (2003). Estimation of Attendance at a Large Outdoor Event. *The Journal of Extension, 41*(5), Article 22. https://tigerprints.clemson.edu/joe/vol41/iss5/22

This Tools of the Trade is brought to you for free and open access by the Conferences at TigerPrints. It has been accepted for inclusion in The Journal of Extension by an authorized editor of TigerPrints. For more information, please contact kokeefe@clemson.edu.

October 2003 // Volume 41 // Number 5 // Tools of the Trade // 5TOT5

PREVIOUS ARTICLE | ISSUE CONTENTS | NEXT ARTICLE

Estimation of Attendance at a Large Outdoor Event

Abstract
Accurately estimating program attendance in large, undefined areas is difficult. Yet attendance is an important factor in effective impact assessment and accountability reporting. A simple method, consisting of a combined activity count and exit poll, can be used to produce reasonable results with a measurable assurance of accuracy. A case study application of this method at a major university campus horticulture event is included to summarize the method.

Anne M. Streich
Extension Educator
Internet Address: astreich2@unl.edu

David B. Marx
Professor of Biometry
Internet Address: dmarx@unl.edu

Jeanette M. Stafford
Graduate Student

Steven N. Rodie
Extension Landscape Specialist
Internet Address: snrodie@unomaha.edu

Kim W. Todd
Extension Landscape Specialist
Internet Address: ktodd2@unl.edu

University of Nebraska
Lincoln, Nebraska

Introduction

Documenting the impact and accountability of educational programming has become an integral part of Extension/outreach programs. This documentation ensures that programs are benefiting clientele and that limited funding resources are being directed to address critical educational needs. Impact reports typically include data relating to social, environmental, and economic program impacts.

High program attendance does not necessarily correlate to high program impact, but attendance, if accurately measured, can be an important factor in accountability reporting. In large settings, it may be difficult to assess the number of people that attend a program. This can be due to one or more of the following factors:

1. There are numerous event entrances and no distinct "main" entrance,
2. The event encompasses a large area, making it impractical to count everyone at one time,
3. Attendees are not required to register, and
4. Attendees come and go at various times during the event.

The following methodology and case study outline one approach to estimate event attendance and

calculate the accuracy of this estimate.

Basic Methodology

Because it is impractical to survey everyone at a large event, a proportion of the attendees should be sampled. The basic assumption behind this estimation method is that an accurate "hard count" of people who complete an event-related action is available. Definable actions may include the number of people who buy a drink or snack, the number of people who pick up a schedule or map, or the number of people who attend a particular activity, such as a talk.

The second piece of required information is attained by sampling a proportion of those people leaving the event. A question relating back to the definable action must be asked. For example, if the total number of drinks sold was the definable action, the appropriate question to ask would be, "Did you buy a drink, and if so, how many did you buy?" This question should be repeated to a manageable percentage of people leaving the event (one out of every three, for example). By asking this question, the average number of times that a person did some action while at that event can be calculated. The number of people attending the event can then be estimated by taking the "hard count" of those buying a drink (X) and dividing it by the average number of drinks per person estimated by the exit sample (Y). This is shown in Equation 1.

Equation (1): $TOTAL = X / Y$

In addition to estimating the total number of attendees, it is also important to estimate the variance (sum of the squared deviations divided by the total observations) of the total number of people attending the event. The total variance is calculated as shown in Equation 2.

Equation (2): $V(TOTAL) = \{V(X)/Y^2\} + \{[X^2 * V(Y)]/Y^3\}$

Where:

- V(X) = variance of the total "hard count"
- V(Y) = variance of the survey data adjusted for a finite population correction
- V(Y) = (1 - p) * (variance of survey values) / n

Where:

- p = proportion of attendees sampled in the survey
- n = number of attendees surveyed

The usual confidence limits of the total can be computed by adding and subtracting twice the standard deviation (positive square root of the variance total, as calculated above) from the total count. This allows an accurate estimate of the total attendance figure to be given with some measure of how good this estimate is.

Case Study

On September 14, 2002, a University of Nebraska Cooperative Extension outdoor event titled "Landscape Connections" was held on East Campus at the University of Nebraska - Lincoln. Thirty-five scheduled talks were given throughout the day. At the beginning of each talk, the number of people attending the talk was recorded. This represented the "hard count." About half of the talks had two people recording the "hard count." The additional counts were used to estimate the variance for the "hard count."

Seven locations were identified where a majority of the attendees would be expected to exit. Every third person exiting through one of these locations was asked "How many talks were you in attendance at the start of the talk?" In this example, it was important to designate "at the start of the talk" because counts were conducted at the beginning of each talk; participants joining the talk after the initial count was completed were not included. An example of the form used to record the number of people surveyed and the number of talks they attend is shown in Figure 1. This form was used for six time periods throughout the day.

Figure 1.
Form Used to Record Number of People Surveyed and Number of Talks Attended

Time period: 1:00 - 2:00 p.m.	
Number of talks attended	Number of people
1	

2	
3	
4	
5	
6	

Statistics were then put into the formula above to calculate a confidence interval for the number of attendees for Landscape Connections. The results are shown in Table 1.

Table 1.
Confidence Interval for Number of Attendees

Description	Value
X	1884
$\overline{Y}$	1.25912
P	1/3
N	274
V(X)	64.2722
Variance of survey data (at seven locations)	2.09012

Therefore:

- TOTAL = 1884/1.25912 = 1496.28
- V(Y) = (1-1/3)*2.09012/274 = 0.005085
- V(TOTAL) = $64.27/1.25912^2+(1884^2*0.005085)/1.25912^3$ = 9084.94
- Confidence interval = square root of 9084.94*2 = 190.63
- Approximate 95% confidence interval for the total number of attendees = 1306 to 1687

Conclusion

Attendance figures are only a small portion of many accountability reports, but still remain an important factor. In many instances, it is impossible or impractical to count participants as they arrive or leave a program conducted in a large area. This simple estimation method, which combines a count and a measure of people's involvement in the activity, can be used to generate an estimate of the total number of people attending the event, as well as a statement of how accurate that estimate is.

Acknowledgement

Contribution no.1011 of the Nebraska Cooperative Extension Division, Institute of Agriculture and Natural Resources, University of Nebraska-Lincoln.