

TEACHING STATISTICS TO A HETEROGENEOUS GROUP: A 'GOAL-ORIENTED' APPROACH

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Teaching elementary concepts of statistical methodology to a heterogeneous group in a small span of time such as a workshop presents a peculiar challenge: how to create a balance between presenting content that is "too difficult" for the beginners and "too boring" for those who already have some orientation of Statistics! This paper presents an account of a particular strategy that was adopted for teaching basics of statistical methodology to a heterogeneous group of faculty-members at a workshop in Lahore, Pakistan—one involving a 'goal-oriented' approach. Feedback from the workshop participants indicates that such a strategy is likely to be successful in arousing the interest of the entire group, of creating the urge in beginners for learning that which is 'too difficult', of developing patience among those who 'already know it all', and—eventually—creating a sense of accomplishment and satisfaction in the entire group.

INTRODUCTION

Workshops are universally recognized as important means of imparting training to small groups on particular topics. During the past few years, a number of research works have been carried out to explore ways and means of enhancing the effectiveness of workshops. (See Marx, 1982; Hogan et al., 1986; Hall & Marshall, 1996; Mazany et al., 1997; Farrell et al., 2001; Green et al., 2003; Drane et al., 2005; Heaven et al., 2009).

Teaching introductory elements of statistical methodology to a heterogeneous group in a workshop spread over a few days poses an interesting problem: how to create an equilibrium so that both the beginners and the non-beginners are satisfied to a reasonable extent. The challenge is magnified if the workshop is being conducted in a country which is still struggling to bring about a 'research culture' in its higher education institutions and universities.

This paper present an account of experiences gained during a five-day long concluding segment of a workshop on Research Methodology that was held at Kinnaird College For Women in Lahore, Pakistan, and in which the author discussed the questionnaire–method of data-generation and elementary techniques of data-analysis with the college–faculty. This was the first time that the author conducted this type of a workshop, and the 'goal-oriented' approach adopted seems to have worked very well in arousing and maintaining the interest of the *entire* group—some group-members being reasonably well-versed in the subject of statistics and some having no orientation whatsoever of statistical methodology.

WORKSHOP AT KINNAIRD COLLEGE

Kinnaird College For Women, Lahore is recognized as one of the leading educational institutions for women in Pakistan. Realizing the need for equipping the teachers with a basic know–how regarding research, workshops on Research Methodology are being organized for the college–faculty in the summers ever since 2007. In the summer of 2009, this workshop was conducted by two faculty–members of the Statistics Department, the first five days on the basics of research methodology by the author's colleague and the last five days on data–generation and analysis by the author. In the five-day long concluding segment of the workshop, the author covered the concepts of simple random sampling, the questionnaire–method of data-generation and some of the elementary techniques of data-analysis.

TEACHING METHODOLOGY

In recognition of the fact that five days were too few for imparting a proper understanding of the role of Statistics in converting data into information by the *conventional* approach, the author decided *not* to give mini–lectures on descriptive measures such as mean, median, standard deviation, regression and correlation and basic tools of inference such as the chi square test of independence and the t-test for the mean, but to lead the group in conducting a mini-survey on a

topic of interest. An advertisement in the daily newspaper by the Higher Education Commission of Pakistan triggered the idea that a survey to ascertain the views of the college–faculty regarding the reasons why Kinnaird—in spite of being regarded as one of the best educational institutions for women in Pakistan—has a relatively *low* research output would capture the interest of all concerned. (The advertisement launched by the Higher Education Commission of Pakistan and entitled “Research Output from Pakistan” contained a list of Pakistani universities along with the number of publications from each university in 2007 and 2008.)

As such, the entire duration of the five-day-long workshop was utilized to accomplish the various stages of a mini-survey, i.e., identification of the topic and the objectives of the survey, formulation of the questionnaire, collection and analysis of data, conclusions and recommendations, and report-writing.

EXCERPTS FROM SURVEY REPORT

Main points of the survey report are presented below:

Title

Survey to Ascertain Strategies to Enhance the Research Output of Kinnaird College.

Research Objectives

- To determine the reasons why—to date—KC has not been able to produce a sizeable number of research publications.
- To determine strategies to bring about a ‘research culture’ at Kinnaird College.

Questionnaire

The questionnaire consisted of questions regarding the respondent’s age, educational qualifications, designation, years of service, and research—works carried out along with the following questions:

- In your opinion, what is the MAIN reason why—to date—there are not many research—publications from Kinnaird College ?
- In your opinion WHAT steps can / should be taken to create a ‘Research –Culture’ at Kinnaird College ?

Main Results

- *Main Reasons for Low Research Output of Kinnaird College:* One of the most crucial questions in the questionnaire was: ‘In your opinion, what is the MAIN reason why—to date—there are not many research—publications from Kinnaird College?’ This question elicited a variety of responses from the respondents. Non-availability of time due to factors such as teaching load and administrative duties turned out to be the most frequently quoted reason (quoted by nearly 70% of the respondents). 50% of the respondents indicated that the lack of proper facilities including internet, availability of digital library at home, equipment, computer, chemicals, access to databases, important computer packages such as SPSS contributed to low research activity, and an equal proportion indicated that there was insufficient push from the higher authorities. As many as 44% mentioned lack of motivation, and 38% complained about lack of guidance and / or training.
- *Main Steps to be taken to enhance the Research Output of Kinnaird College:* The last question in the questionnaire was: ‘in your opinion what steps can / should be taken to create a ‘Research –Culture’ at Kinnaird College?’ Analysis of the collected data yields are shown in Table 1.

RESPONSE OF THE WORKSHOP PARTICIPANTS

The initial response of the workshop participants was that of interest and enthusiasm. They participated actively in identifying the various factors associated with the fact that Kinnaird lacked a ‘research-culture’ in the real sense of the word and, once the questionnaire was developed and filled out, the entire group demonstrated a desire to not only analyze the data in a proper way so as to come up with useful conclusions but also to accomplish a written report to be presented to the

Principal. To everybody's satisfaction, the fifth day witnessed the completion of the Survey-Report containing the objectives of the study, literature review, survey-methodology, the questionnaire, an analysis of the collected data, results, conclusions and recommendations. The environment of the five-day workshop was thus productive and positive all through, beginning with interest and excitement, continuing with a sense of purpose, and culminating in a sense of achievement and fulfillment on the part of the participants.

Table 1. Analysis of the collected data yields

Steps to be taken for creating a 'Research Culture' at Kinnaird College	No of respondents	Percentage of respondents
Provision of facilities	15	75%
Appreciation by Authorities / Incentives Availability of time	10	50%
Workshops/Seminars	10	50%
Guidance for research	7	35%
Research Policy	3	15%

FEEDBACK FROM PARTICIPANTS

In recognition of the fact that feedback plays an important role in creating awareness of one's strength and weaknesses, the author administered an open-ended questionnaire on the workshop-participants on the fifth and final day of the workshop. The questions were as follows:

1. What were your expectations from this chunk of the Workshop prior to its commencement ?
2. What kind of an \experience has it been ?
3. What aspects of the workshop, if any, did you enjoy ?
4. What aspects of the workshop did you not enjoy ?
5. To what extent has this chunk of the workshop been beneficial for you ?
6. What are your suggestions for the improvement of similar workshops in the future ?

The responses of three of the sixteen respondents are presented below:

Participant No.1:

1. That we would be doing statistical analysis of data collected and that it would be a dry, technical job.
2. It has been a good learning experience; learning in a relaxed interactive manner. It was in fact quite the opposite of my expectations as far as the 'dryness' is concerned.
3. The realization that stats is not dry at all but very closely related to other disciplines e.g. my own subject English. I've enjoyed the communication style of the teacher, involving students by name, sharing her personal experiences and communicating at one's one level.
4. Not being able to use the computer
5. I now know at least the very basics of stats. Terminology; I can analyze data even if at a very basic level; I am interested in working on the SPSS!
6. Small example data sheets should be provided first so students can work on it individually by hand. Then computer application at individual level should be carried out.

Participant No.2:

1. To learn SPSS. To strengthen my general statistics SPSS based knowledge. To gauge the research potential on interdisciplinary basis.
2. Enlightening; Inspiring/Motivating; Confidence building
3. The research report itself! The way it was prepared teaching the procedure side by side. Teaching methodology was superb!
4. Enjoyed every single moment!

5. Revitalized my academic energies and re-channelized the research instinct. Taught me how to utilize the much accumulated data from my class.
6. Individual access to computer ; Individually collect data to be analyzed during class-sessions, so as to produce at least one independent research once the workshop ends.

Participant No.3:

1. May be she will teach some thing which we already know and may be it will improve our knowledge.
2. It was a very good experience. The teacher was very competent in the subject course she taught. We gained a lot of knowledge about statistics and the way we can do research. At least we have come to know how to proceed for research.
3. Way of teaching is very interesting we did not lose our attention of (concentration upon the lecture). We kept on listening and do not feel sleepy. She is polite.
4. It is beneficial for doing research. We have come to know the exact method can be carried out (without confusion).

The participants' responses testify to the usefulness and effectiveness of the workshop.

CONCLUDING REMARKS

In this paper, we have presented an account of a particular strategy that was adopted for teaching basics of statistical methodology to a heterogeneous group of faculty-members at a workshop in Pakistan—one involving a 'goal-oriented' approach. Feedback from the workshop participants indicates that the strategy proved to be successful in arousing the interest of the entire group of participants, of creating the urge in beginners for learning that which was 'too difficult', of developing patience among those who 'already 'knew it all', and—last but not the least—in creating a sense of achievement and fulfillment in the entire group at the end of the workshop.

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