

Effectiveness Of An Mhrd Workshop On Instrumentation – An Empirical Study

Prof. B. William Dharma Raja, Dr V. Sasikala

Abstract: Instrumentation refers to the tools or means by which investigators attempt to measure variables or items of interest in the data-collection process. Present paper evaluates the effectiveness of the workshop on instrumentation organised by the Centre for Teacher Resource and Academic Support, under School of Education sanctioned under Pandit Madan Mohan Malaviya National Mission on Teachers and Teaching (PMMMNMTT) scheme by the MHRD, Government of India in imparting knowledge on construction of a quality research tool among/for research scholars and young supervisors. Pre-test post-test single group design was adopted to evaluate the effectiveness of the workshop on imparting important criteria, principles, development and construction of a quality research instrument. The subjects for the study were 25 research scholars and young supervisor who were the participants of the workshop from four states of India. The data was collected using an 'Achievement Test on Tool Construction' developed and validated by the investigators. The twelve hours of intensive lectures and hands on training on instrumentation piloted by two well renowned resource persons were the intervention. The results of paired t-test analysis revealed that there was a statistically significant difference among research scholars and young supervisors. The findings of the study revealed that workshop on instrumentation significantly impacted the participants to gain knowledge of designing a reliable, valid and credible research instrument.

Index Terms: Credible Research Instrument, Instrumentation, Quality Research, Workshop Effectiveness.

1. INTRODUCTION

ADDRESSING to the ever changing diverse needs and demands of the society is quintessential for the development of any nation. Research is a scholastic attempt towards growth and development. Education is the most important sector where research is predominant as it builds knowledge for facilitating learning and creating public awareness to understand various issues and challenges. The Ministry of Human Resource Development (MHRD), Government of India, has embarked a country wide endeavour to bring in radical transformation in teachers and teaching through the initiation of Pandit Madan Mohan Malaviya National Mission on Teachers and Teaching (PMMMNMTT). The main purpose of organising the national level Workshop on Instrumentation by the Centre for Teacher Resource and Academic Support (CTRAS) under this scheme is to enable the research scholars and young supervisors to acquire, develop and improve the knowledge and skills they need to address one of the core challenges of producing quality research instruments in the field of education. This workshop retrained and refreshed the significant research skills of assessing the research instruments measuring properties which ensures the selection and designing of valid and reliable tools which subsidize quality of result of studies among research scholars and young supervisors [3]. Mission of the WorkshopThe workshop is designed to reinforce, imprint and bring forward an immediate functioning dimension among participants' head, heart and hand coordination by implementing and practicing the actual concept or technique that was taught through the lecture and demonstration process. It is envisioned for rigorous discussion and excessive experience to craft the young supervisors and research scholars to construct and validate their own research tool to suit their need. The intensive training and interactive platform intend to enrich their cognitive aspects and offer an

insight over the instrumentation process. Today, researchers, especially in the field of education are in a position to develop new tools which suit their presumed objectives. The problem chosen by every researcher is different and their approach and perception towards a problem is different. To suit their needs and insight of the research, the researcher has to develop his/her own tool. Hence the workshop was designed to equip the scholars with the vital skill of mounting out their own instrument with essential credentials of a standardized tool. Measurement instruments play an important role in research [3]. The major objectives of the workshop were to identify the stages in tool development; to acquire knowledge regarding the need for reliable and valid research tool for a successful research; to use theoretical base while generating items; to compare various tools and their features and select the appropriate tool required for their proposed study; to promote the skill of writing items; to select those items with best reliability and most independent information to design a simplified form suitable for routine use in the desired setting; to guide the researchers to improve the tool by following the steps in tool development; and to validate an objective instrument to measure the selected variable of interest. Significance of the StudyResearch plan begins with selection of the most efficacious way to collect data for the research. The construction of research tool is the first practical step in carrying out a study. Instrumentation is the course of action in research terms. It means the process of developing, testing or using a devise for collecting required data. It includes selection of the instrument design, construction, and assessment. The investigator can use one or more tools for a single study. The nature of the tool depends on the nature of the problem under investigation and the sample of the study. The selection of suitable tool is necessary for successful research. They help in guiding the progress of the study to the ultimate goal of gathering data and formulating conclusions to answer the research question. Calibration in the measuring instrument may cause threat to internal validity of any research. In order to reduce the errors in the measurement process, a focus on the quality of developing a reliable and validated instrument is primary [2]. The process of developing and validating an instrument is in large part focused on reducing error in the measurement process. Enormous questionnaires or

- Author name is Prof. B. William Dharma Raja, Project Coordinator, School of Education, PMMMNMTT(MHRD Project, GoI) & Head, Department of Education, Manonmaniam Sundaranar University, Tirunelveli, Tamilnadu, India, Mob-9443195395. E-mail: widh07@yahoo.com
- Co-Author name is Dr V. Sasikala Assistant professor (T), Department of Education, Manonmaniam Sundaranar University, Tirunelveli, Tamilnadu, India, Mob-9445044335. E-mail: ambulisasikala@yahoo.co.in

measurement instruments that assess psychosocial characteristics are available to be used in researches, but literature alerts researchers that many of them have not been adequately validated and claims need of a deep evaluation of the measurement properties of questionnaires [5]. The demand and need for development of new and standardized tool is increasing to a great extent, the simple reason is either standardized tools are not available or available tools lack reliability and validity in that setting. This workshop explores the steps and process which provides base by which a reliable and valid tool can be developed. It discusses instrumentation process, which include development and validation of a quality research tool. Conducting a workshop or seminar with noble objectives will not alone serve the purpose. Measuring and evaluating whether the targeted participants have gained or aided, the learning outcome of any event reveals the vivid picture of success of the event. So the study is significant in aiding to know whether the objectives have been accomplished.

Objectives of the study

1. To find out the effectiveness of the 'Workshop on Instrumentation' in imbibing knowledge of tool construction among the research scholars and young supervisors;
2. To find out the level of participants of workshop in their pretest scores and post test scores with regard to achievement test in tool construction; and
3. To find out significant difference, if any, between pre-test and post-test mean scores of participants in achievement test in tool construction.

Hypothesis

The study proceeded with the hypothesis, 'There is no significant difference between pre-test and post-test mean scores of participants in achievement test on tool construction'.

Methodology

The One-Group, Pretest-Posttest design [1]. was adopted for the study. The sample was the research scholars and young supervisors who enrolled themselves for the national level workshop on Instrumentation. So, it is obvious that convenience/purposeful sampling technique was employed. A self-constructed achievement test with 20 items regarding fundamentals of tool construction, developed by the investigators and validated by two experts, was used for conducting the pre-test. Parallel form of the same test was prepared for the conduct of posttest, without changes in its content and difficulty level.

Procedure for conducting the experiment:

The first phase of the research, pre-test was administered to participants at the beginning of the workshop immediately after the inauguration and before the first session of the workshop with prior intimation and consent from them, to use the data collected for research purpose only. After all sessions dealing with the essential concepts and criteria for construction of good research tool delivered by two resource persons by means of interaction, discussion, assignments, and mind blooming activities, the second phase test, post test was conducted at the end of the workshop. The investigators facilitated conduct of both the tests.

Statistical Analysis

The collected data was analysed using the statistical tests namely mean, SD and paired t test.

Table 1

Level of Achievement in Pretest and Posttest in Instrumentation

Test	Level	Frequency	In %
Pre test	Low	3	12
	Moderate	16	64
	High	6	24
Posttest	Low	2	8
	Moderate	16	64
	High	7	28

The above table reveals that more than three-fifth of the participants had average level of achievement in tool construction in the pretest and posttest.

Table 2

Significance of Difference between Pretest and Posttest Achievement

Test	N	Mean	SD	r value	t value	P value
Pre test	25	29.90	9.199			
Post test	25	47.80	13.623	0.268	6.282	0.000**

**** Significant at 1% level**

The above table reveals that the value of 'p' (0.000) is significant at 1 % level. Hence the null hypothesis is not accepted. It means that the workshop participants show a significant difference in achievement in tool construction between pre-test and post-test. The mean scores show that the participants performed better in the post-test than in the pre-test.

Findings

1. More than three-fifth of the participants had average level of achievement in tool construction in the pretest and posttest.
2. The twelve hours intensive training on instrumentation have enabled three participants who were found to be at low level in pre-test to move to average level, and four participants who gained average score in pre-test to high level in their scores in achievement in tool construction.
3. Significant difference existed between the pre-test and post-test scores of the workshop participants with regard to achievement test in tool construction.

Apart from the above findings, the participants' oral and written feedback is also presented here under: Workshop enlightened the knowledge on concepts, constructs, principles of measurement, variable map, and Reliability and validity which are considered as the main measurement properties of such instruments (Jebaraj).The sessions were interactive and well-structured which was very clear to understand (Bala Ayyappan). Resource person smartly linked research with real

life examples which made it interesting and impressive (Pratheba, oral feedback). Another research scholar Kanthimathi expressed that the workshop gave chance to recall the known concepts, gain new knowledge and ideas. The day was fruitful to the participants by all means. The eminence of resource persons made the workshop productive (Prabha).

Implications

- Conduct of training and intervention programmes on instrumentation is essential because the research scholars and young supervisors who are pursuing their research and future teacher educators must definitely have a profound knowledge on instrumentation. This study revealed that more than three-fifth of the participants clustered around moderate level, which signifies the importance of such workshops.
- The theme of any event may be planned based on the survey conducted to know the needs from the target group. The organisers of the event also must ensure homogeneity among the participants in order to plan the content and choose appropriate resource person to serve the needs of participants.
- Evaluating the result and impact of any event may yield valuable insights that inform others to consider similar reform in academia.
- Participants' genuine feedback including, positive appraisal and criticism may be recorded and given due importance for effective organisation of future events.
- Selection of resource person is pivotal in any event. Based on the topic of the event prominent, experienced and interactive persons who could be apportioned is crucial.
- Encouragement for active participants may be announced to provide a platform to break their shells and to get clarified with their doubts with experts.
- Facilitating inter-interaction activities among the participants to develop collaboration among the academic community.

CONCLUSION

Instrumentation is one of the significant determinants of quality research. UGC also proposes to gauge the quality of Indian researches in all the disciplines conducted by various universities. This study on the effectiveness of the workshop on instrumentation provide evidence of how such programme help the researcher construct the best tool to use in order to ensure quality results. Researchers should devote attention to the intricacies around the scale construction, to create high quality scale scores to better represent a variable. This study suggests how the workshop, which represents the procedure of construction of a viable and valid tool, is very pivotal in providing information about the understudied domain of research on instrumentation. Furthermore, this study has made a significant contribution to quality research by experimenting how instruments can be validated in a higher education research context. It is also important for policy makers and educationists to understand to what extent the workshop is important so that they can frame realistic policies to fit the demands of doing quality research.

Test	Level	Frequency	In %
Pre test	Low	3	12
	Moderate	16	64
	High	6	24
Posttest	Low	2	8
	Moderate	16	64
	High	7	28

REFERENCES

- [1] John W. Best, and J.V. Kahn, Research in Education (9thed), New Delhi: Prentice- Hall of India, 2006.
- [2] C.L. Kimberlin and Almut G. Winterstein, "Validity and reliability of measurement instruments used in research". Am J Health-Syst Pharm, 65, 2008, available at <http://www.aihepworth.yolasite.com/resources/9817-Reliability%20and%20validity.pdf>
- [3] A.C. De Souza, N.M.C. Alexandre, and E.B. Guiardello, "Psychometric properties in instruments evaluation of reliability and validity", Epidemiol. Serv. Saude, Brasília, vol. 26, no. 3, 2017, doi: 10.5123/S1679-49742017000300022.
- [4] N.J. Salkind, "Encyclopedia of research design", Thousand Oaks, CA: SAGE Publications, Inc, 2010, doi: 10.4135/9781412961288H.
- [5] S.S. Salmond, "Evaluating the reliability and validity of measurement instruments", OrthopNurs, vol. 27, no. 1, pp. 28-30, 2008, Available at <https://www.ncbi.nlm.nih.gov/pubmed/18300685K>.
- [6] X. Wang, and S.Y. Lee, "Investigating the psychometric properties of a new Survey instrument measuring factors related to upward transfer in STEM fields", The Review of Higher Education, vol. 42, no. 2, pp.339-384, 2019.