Evaluating the Limits of Technology Integration in Short-Term Research Training: Evidence from an ICSSR-Sponsored Course

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Abstract

Research training programmes are essential for enhancing methodological competence among early-career scholars, yet the role of technology integration in short-term workshops remains under-explored. This study examines the effectiveness of a technology-integrated, ICSSR-sponsored Research Methodology Course (RMC) by evaluating participants' perceptions of technology usage, ease of use, usefulness, and attitude. Adopting a mixed-methods descriptive survey design, data were collected from 120 research scholars and faculty members using a structured Likert-scale questionnaire and an open-ended reflection. Quantitative analysis using Pearson correlation and multiple linear regression revealed a significant paradox: while participants reported high reliability ($\alpha > 0.80$) and positive attitudes toward technology, these factors did not significantly influence the perceived effectiveness of the course. The regression model indicated that technology-related variables explained a negligible 1.1% of the variance in course effectiveness ($R^2 = 0.011, p > 0.05$). Qualitative thematic analysis provided a critical explanation for these "null" findings, revealing that participants prioritized "human-centric" factors—such as financial security (stipends), residential facilities (meals and accommodation), and academic networking—over software training. Furthermore, a persistent "digital infrastructure gap," characterized by a lack of personal laptops among scholars, hindered the long-term utility of the technology integrated into the workshop. The study concludes that in the context of Indian social science research, technology serves as a "hygiene factor" rather than a primary driver of training success. True effectiveness is shaped by a broader ecosystem of socio-economic support and mentorship. These findings suggest that national funding agencies should move beyond a purely "tech-centric" model to prioritize infrastructure access and sustained financial support for scholars from diverse backgrounds.

Keywords: *Research Methodology, ICSSR, Technology Acceptance Model (TAM), Digital Divide, Capacity Building, Social Science Research.*

1. Introduction

The landscape of higher education and scholarly inquiry has undergone a profound transformation, placing an unprecedented premium on methodological rigor and technical proficiency. Research training programmes have emerged as a cornerstone of this transition, serving as essential vehicles for strengthening the capacity of faculty members and early-career researchers. In developing academic systems, short-term workshops and intensive research methodology courses (RMCs) act as structured platforms designed to foster scholarly engagement, refine analytical skills, and bridge the gap between theoretical knowledge and practical application. These programmes are particularly vital for scholars who require guided exposure to contemporary research designs, sophisticated data analysis techniques,

and the evolving norms of academic publishing. In the Indian context, the commitment to social science research capacity building is exemplified by the initiatives of the Indian Council of Social Science Research (ICSSR). Through its national-level funding mechanisms, the ICSSR has been instrumental in democratizing access to research training by supporting RMCs across diverse regional and institutional settings. These courses are intentionally designed to be inclusive, offering financial assistance, travel support, and residential facilities to ensure that scholars from marginalized backgrounds or remote institutions can participate without the burden of financial strain (Bhattacharya, 2019). Consequently, these workshops are viewed not merely as instructional sessions but as meaningful "methodological spaces" (Ørngreen & Levinsen, 2017). They function as dynamic learning environments where knowledge is not just transferred from expert to novice but is co-constructed through dialogue, peer reflection, and collaborative problem-solving. In recent years, the integration of technology has become a defining characteristic of these training programmes. The shift toward data-driven inquiry has made digital tools, statistical software (such as SPSS, R, or NVivo), and online bibliographic databases indispensable to the modern researcher. The underlying assumption is that technology integration enhances training effectiveness by simplifying complex analytical processes and increasing participant engagement. Within the broader field of educational technology, the Technology Acceptance Model (TAM) has long served as the dominant framework for understanding how individuals adopt new tools based on their "Perceived Usefulness" (PU) and "Perceived Ease of Use" (PEOU) (Davis, 1989). However, while TAM has been extensively validated in long-term formal education settings, its applicability to high-intensity, short-duration research workshops remains an area of active scholarly debate. The reality of technology integration in the Global South, and specifically within Indian social science research, is complicated by what researchers term the "Digital Divide" (Selwyn, 2010). While a course may be "technology-integrated" in its delivery, the effectiveness of such integration is often limited by the socio-economic realities of the participants. Many scholars in India face systemic barriers, including a lack of personal hardware—such as laptops—and a lack of consistent fellowship support, which hinders their ability to practice and internalize the digital skills taught during a workshop (Warschauer, 2003). Therefore, evaluating the "effectiveness" of these courses requires a lens that goes beyond simple technology adoption and considers the broader ecosystem of support, including financial security and institutional infrastructure. Despite the proliferation of ICSSR-sponsored RMCs, there is a surprising scarcity of empirical evidence evaluating their effectiveness from the perspective of the participants. Existing literature often focuses on policy-level discussions or broad pedagogical theories, leaving a gap in our understanding of how technology-related perceptions—usage, ease of use, and attitude—actually correlate with the perceived success of the training. Furthermore, there is a need to investigate whether the "human" and "contextual" factors of the workshop (such as networking, meals, and stipends) carry more weight in the minds of scholars than the software demonstrations themselves. Against this backdrop, the present study examines the effectiveness of a technology-integrated, ICSSR-sponsored Research Methodology Course. By synthesizing quantitative data on technology acceptance with qualitative reflections on the lived experience of the participants, this research seeks to provide a nuanced understanding of what truly makes research training effective. The study moves beyond the "tech-optimism" of modern pedagogy to ask a critical question: In an environment where infrastructure is uneven and financial support is vital, how much does technology integration truly contribute to the perceived growth of a researcher? By exploring the interplay between technology usage, perceived ease of use, usefulness, and participant attitudes, this study aims to offer practical insights for policymakers and academic organizers committed to sustainable research capacity building.

2. Objectives and Hypotheses

- To examine the extent and nature of technology usage among participants during the ICSSR-sponsored Research Methodology Course.
- To assess participants' perceptions regarding the ease of use, perceived usefulness, and overall attitude toward the digital tools and software integrated into the training sessions.
- To determine the relationship between technology acceptance variables and the participants' perceived effectiveness of the course.
- To investigate the degree to which technology-related factors predict the overall evaluation of the training program.

- To capture qualitative insights into the non-technological and infrastructural factors—such as financial support and hardware access—that shape the training experience for research scholars.

2.1 Hypotheses of the Study

Based on the theoretical framework of the Technology Acceptance Model (TAM) and the objectives mentioned above, the following null hypotheses were formulated for statistical testing:

- H_{01}: Technology usage does not have a significant influence on the perceived effectiveness of the Research Methodology Course.
- H_{02}: Perceived ease of use does not have a significant influence on the perceived effectiveness of the Research Methodology Course.
- H_{03}: Perceived usefulness does not have a significant influence on the perceived effectiveness of the Research Methodology Course.
- H_{04}: Attitude toward technology does not have a significant influence on the perceived effectiveness of the Research Methodology Course.

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3. Methodology

3.1 Research Design

The study adopted a descriptive and analytical survey design, utilizing a mixed-methods approach to data collection. This design was selected because it allowed the researchers to capture a broad snapshot of participant perceptions at a single point in time—immediately following the conclusion of the course. By combining quantitative scaling with a qualitative open-ended component, the study sought to move beyond surface-level statistics to understand the deeper contextual realities of the participants.

3.2 Population and Sample

The population for this study consisted of faculty members and research scholars across various social science disciplines who attended a 10-day ICSSR-sponsored Research Methodology Course. The participants were drawn from diverse geographical regions and institutional types, representing a cross-section of the Indian academic landscape. A total of 120 valid responses were obtained through convenience sampling. Participation was entirely voluntary, and only those individuals who had attended both the theoretical lectures and the hands-on software training sessions were included to ensure the validity of the data.

3.3 Tool for Data Collection

A comprehensive, structured questionnaire was developed to serve as the primary instrument for data collection. The questionnaire was divided into two distinct parts:

- Section A: Focused on demographic profiles and background information, including institutional affiliation and discipline. Crucially, it also included queries regarding the participants' access to personal research infrastructure, such as laptops and fellowship funding.
- Section B: Contained 24 items designed to measure the study's core variables: Technology Usage (5 items), Perceived Ease of Use (4 items), Perceived Usefulness (5 items), Attitude Toward Technology (4 items), and Perceived Effectiveness (6 items).

All items in Section B were measured using a five-point Likert scale, ranging from 1 (Strongly Disagree) to 5 (Strongly Agree). Additionally, one qualitative open-ended question was included at the end of the survey: *"Please share any additional reflections on your experience during the course."* This allowed participants to mention factors not captured by the Likert scales, such as the importance of meals, accommodation, and the lack of personal laptops.

3.4 Validity and Reliability

To ensure the instrument was robust, the items were adapted from established TAM literature and modified to suit the specific context of an Indian Research Methodology Course. Content validity was ensured through a review process by subject matter experts in research methodology and education.

The internal consistency of the scales was rigorously tested using Cronbach's alpha. The analysis yielded high reliability coefficients across all constructs:

- Technology Usage (α = 0.906)
- Perceived Ease of Use (α= 0.884)
- Perceived Usefulness (α= 0.802)
- Attitude Toward Technology (α= 0.851)
- Perceived Effectiveness (α = 0.898)

Since all values significantly exceeded the generally accepted threshold of 0.70 (Nunnally, 1978), the instrument was deemed highly reliable for further statistical analysis.

3.5 Method of Data Collection and Ethical Considerations

The questionnaire was administered digitally after the final session of the 10-day course. Participants were briefed on the academic nature of the study and were assured of their anonymity. No personal identifiers, such as names or specific department names, were collected to ensure that participants felt free to provide honest feedback, particularly regarding the qualitative aspects of the training and infrastructure.

3.6 Data Analysis Strategy

The quantitative data were processed using statistical software to perform a sequence of analyses:

1. Descriptive Statistics: To calculate mean scores and standard deviations for each construct.
2. Pearson Correlation: To examine the linear relationships between technology acceptance variables and course effectiveness.
3. Multiple Linear Regression: To test the four null hypotheses and determine the predictive power of the independent variables.
4. Thematic Analysis: The qualitative responses from the open-ended question were analyzed using a thematic approach. This involved coding the text to identify recurring patterns related to financial support, infrastructure barriers, and the social value of the workshop.

5. Results

5.1 Reliability and Descriptive Analysis

The initial phase of the data analysis focused on ensuring the psychometric integrity of the research instrument. The internal consistency of the measurement scales was assessed using Cronbach's alpha. The results demonstrated excellent reliability across all constructs, with Technology Usage (α= 0.906) and Perceived Effectiveness (α = 0.898) showing particularly high consistency. Perceived Ease of Use (α = 0.884), Attitude Toward Technology (α= 0.851), and Perceived Usefulness (α = 0.802) also exceeded the recommended thresholds. These coefficients confirm that the participants interpreted the survey items consistently, providing a stable foundation for the subsequent inferential analysis. Descriptive statistics further revealed that participants generally held positive perceptions of the technological tools integrated into the course, with mean scores for "Ease of Use" and "Attitude" trending toward the higher end of the Likert scale.

Construct	Number of Items	Cronbach's Alpha
Technology Usage (TU)	5	0.906
Perceived Ease of Use (PEOU)	4	0.884
Perceived Usefulness (PU)	5	0.802
Attitude Toward Technology (AT)	4	0.851
Perceived Effectiveness (EFF)	6	0.898

5.2 Correlation Analysis

To explore the relationship between technology-integrated training and its perceived success, Pearson correlation analysis was conducted. Paradoxically, the results revealed weak and statistically non-significant correlations between the independent variables—Technology Usage, Perceived Ease of Use, Perceived Usefulness, and Attitude Toward Technology—and the dependent variable, Perceived Effectiveness. None of the technology-related perceptions demonstrated a linear association with the participants' overall evaluation of the Research Methodology Course ($p > 0.05$). This suggests that while participants may have appreciated the digital components of the training, these elements were not the primary lenses through which they judged the overall quality or impact of the course.

5.3 Regression Analysis

To further investigate the predictive power of technology acceptance on course effectiveness, a multiple linear regression analysis was performed. The overall regression model was found to be statistically non-significant ($F = 0.324, p = 0.861$). The model's coefficient of determination ($R^2 = 0.011$) indicated that technology-related factors explained only a negligible 1.1% of the variance in the perceived effectiveness of the course.

The specific coefficients for each predictor were as follows:

- **Technology Usage (TU):** $\beta = 0.002, p = 0.980$ Thus, H_{01}**was accepted.**
- **Perceived Ease of Use (PEOU):** $\beta = 0.065, p = 0.488$ Thus, H_{02}**was accepted.**
- **Perceived Usefulness (PU):** $\beta = 0.084, p = 0.369$. Thus, H_{03}**was accepted.**
- **Attitude Toward Technology (AT):** $\beta = 0.007, p = 0.940$. Thus, H_{04}**was accepted.**

These results provide robust statistical evidence that technology-integrated features, while a modern addition to the curriculum, did not significantly determine how participants evaluated the effectiveness of the ICSSR-sponsored training.

Predictor Variable	Standardized Beta (β)	p-value
Technology Usage (TU)	0.002	0.980
Perceived Ease of Use (PEOU)	0.065	0.488
Perceived Usefulness (PU)	0.084	0.369
Attitude Toward Technology (AT)	0.007	0.940

5.4 Qualitative Reflections: The Role of Human and Infrastructural Factors

The "null" findings of the quantitative analysis were illuminated by the qualitative data gathered through the open-ended responses. When asked to reflect on their experiences, participants shifted the focus away from software and toward the material and social realities of the workshop. Three dominant themes emerged from the thematic analysis:

1. The Digital Infrastructure Gap: A recurring concern among participants was the lack of personal hardware. Several scholars noted that while the laboratory sessions were helpful, the absence of a personal laptop prevented them from practicing the software in their own time or after the course. One participant noted, *"The software sessions were good, but most of us don't have a laptop to use this knowledge later, making the technology part feel temporary."*

2. Financial Security and Institutional Support: Participants highlighted that the effectiveness of the course was deeply tied to the financial support provided by the ICSSR. The provision of travel allowances, free accommodation, and quality meals was cited as a major factor that allowed scholars to focus on learning without the stress of personal expense. For many, the "effectiveness" of the course was defined by the fact that it was financially accessible to those without active fellowships.

3. The Value of Human Interaction: Beyond any digital tool, participants prioritized the networking opportunities provided by the residential nature of the course. Informal discussions with experts and peer-to-peer learning from scholars across different states were identified as the most transformative aspects of the 10-day programme. The social capital gained through these interactions appeared to outweigh the technical skills gained through technology usage.

6. Discussion

The primary objective of this study was to evaluate the effectiveness of a technology-integrated Research Methodology Course by examining the interplay between technology acceptance and participant evaluation. The quantitative results present a significant paradox: while participants reported high mean scores and positive attitudes toward the technology used during the course, these factors had no statistically significant influence on their perception of the course's overall effectiveness. The rejection of all four research hypotheses indicates that the traditional Technology Acceptance Model (TAM), which successfully predicts behavior in long-term professional or educational settings, may have limited explanatory power in the context of short-term, intensive research workshops in the Global South.

This lack of correlation suggests that for research scholars and faculty members, "technology" is perceived as a secondary instructional aid rather than the core value proposition of the training. The findings imply that a participant's ability to navigate statistical software or their positive attitude toward digital tools does not automatically translate into a feeling that the training was successful. Instead, the effectiveness of the Research Methodology Course appears to be shaped by a much broader and more complex ecosystem of support and engagement.

The qualitative insights provide a critical explanation for these quantitative "null" findings. The most prominent barrier identified by participants was the "Digital Infrastructure Gap." In a setting where a significant number of researchers do not own a personal laptop, technology-integrated sessions—no matter how well-delivered—remain confined to the computer lab. As highlighted in the responses, the knowledge of software feels "temporary" when the scholar lacks the hardware to apply those skills in their daily research work. This aligns with the arguments made by Selwyn (2010), who posits that digital inequality is not just about a lack of skills, but about the lack of sustainable access to the tools of production. For these scholars, the perceived effectiveness of a course is not driven by the software they used for ten days, but by the transferable methodological logic they can carry back to their home institutions.

Furthermore, the study underscores the vital role of the "Human and Socio-Economic Element" in research capacity building. The frequent mention of ICSSR fellowships, travel support, and residential facilities suggests that for many Indian scholars, financial security is a prerequisite for academic engagement. In an academic environment where many researchers are "self-funded" or come from economically strained backgrounds, the provision of a structured, funded learning environment is itself the primary indicator of effectiveness. When a course removes the financial anxiety associated with travel and subsistence, it creates a "psychological safety zone" that allows for deep learning. This suggests that the ICSSR's model of providing holistic support is more critical to a course's success than the specific software packages it introduces.

Finally, the discussion must address the value of social capital. The participants' emphasis on networking and informal peer interaction confirms the view of Ørngreen and Levinsen (2017) that workshops are essentially social learning

spaces. The "effectiveness" of the Research Methodology Course is rooted in the relationships built between scholars from different states and disciplines. These human connections provide a long-term support network that technology cannot replicate. Therefore, the study suggests that while technology integration is a necessary modern requirement, it remains a "hygiene factor"—its absence might cause dissatisfaction, but its presence alone does not drive the perceived success of the training. True effectiveness is a product of high-quality instruction, peer-to-peer networking, and the removal of socio-economic barriers to learning.

7. Conclusion

The present study provides a critical evaluation of the effectiveness of technology-integrated Research Methodology Courses conducted under the ICSSR framework. By examining the perceptions of 120 participants through the lens of the Technology Acceptance Model (TAM), the research sought to determine whether the modern emphasis on digital tools and software truly drives the perceived success of research training. The findings lead to a significant conclusion: while technology is a highly visible and appreciated component of contemporary research workshops, it does not function as the primary determinant of a course's perceived effectiveness.

The statistical acceptance of all four null hypotheses reveals a disconnect between technology acceptance and overall training evaluation. Participants' positive attitudes toward software and their perceptions of its ease of use did not significantly influence their final assessment of the programme's success. This leads to the conclusion that in the context of short-term, intensive training for social science researchers in India, effectiveness is a multi-dimensional construct that transcends digital proficiency. The "effectiveness" of such courses is rooted in a much broader "support ecosystem" that addresses both the intellectual and material needs of the scholar. A central conclusion of this research is that the socio-economic and infrastructural realities of the participants—specifically the lack of personal laptops and the reliance on fellowship support—act as mediating factors in the learning process. For a scholar facing a "digital divide," the value of a workshop lies less in the specific software demonstrated and more in the removal of financial barriers and the provision of a structured, interactive academic environment. The qualitative reflections of the participants underscore that travel support, accommodation, and quality mentorship are the true pillars of a successful ICSSR-sponsored programme. Ultimately, this study concludes that technology-integrated research training must be balanced with a "human-centric" approach. While it is essential to equip researchers with modern digital skills, organizers must recognize that technology is a supportive tool rather than a magic bullet. The true success of capacity-building initiatives in social science research depends on their ability to foster social capital, provide financial security, and offer high-quality pedagogical engagement. For the ICSSR and similar national agencies, the findings suggest that the residential and funded nature of these courses is their greatest strength, providing a vital lifeline to scholars who might otherwise be excluded from the global research community due to a lack of resources.

8. Implications and Limitations

8.1 Implications

The findings of this research offer several critical implications for policymakers, academic administrators, and national funding agencies such as the ICSSR. By demonstrating that technology acceptance does not automatically translate into perceived effectiveness, this study challenges the "techno-optimistic" assumption that simply adding software training to a curriculum ensures a successful outcome.

For Policy and Planning:

The most significant implication is the need for a shift from a purely "tech-centric" model to a "scholar-centric" support model. Since participants highlighted the lack of personal hardware as a major barrier, funding agencies should consider expanding the scope of their support. This could include providing subsidized "infrastructure grants" for laptops to research scholars or ensuring that the institutions hosting these courses provide extended access to computer labs long after the 10-day workshop ends. If scholars cannot practice what they learn, the investment in technology-integrated training yields diminishing returns.

For Institutional Support:

The study underscores that "financial cushioning"—in the form of travel allowances, stipends, and quality accommodation—is not a luxury but a fundamental necessity for effective learning. Organizers must maintain these support structures, as they create an enabling environment that allows scholars from diverse socio-economic backgrounds to participate on an equal footing. In the Indian context, the residential nature of the ICSSR course is its most effective feature, as it fosters the social capital and peer-to-peer networking that participants value most.

For Pedagogical Design:

The results suggest that course coordinators should focus more on "Methodological Thinking" and "Theoretical Logic" rather than just the procedural "clicking" of software. Since technology usage was not a significant predictor of effectiveness, the "human" quality of the instruction and the relevance of the content to the scholars' actual PhD work should remain the priority. Technology should be positioned as a complementary aid, used to enhance—not replace—deep conceptual engagement and mentorship.

8.2 Limitations and Scope for Future Research

1. **Self-Reported Data:** The study relied on the subjective perceptions of participants. While Likert scales and open-ended questions capture "felt" experience, they are susceptible to individual biases and social desirability effects, where participants might feel inclined to rate a government-sponsored course positively.

2. **Contextual Specificity:** The research focused on a single ICSSR-sponsored Research Methodology Course. Therefore, the results may not be fully generalizable to all types of workshops or different academic disciplines outside of the social sciences. The specific dynamics of this 10-day programme may differ from shorter 3-day workshops or semester-long courses.

3. **Cross-Sectional Nature:** This study measured perceptions immediately after the course. It does not account for the long-term impact of the training. It is possible that the "Perceived Usefulness" of the technology increases months later when a scholar begins their actual data analysis, or conversely, decreases if they still lack a laptop to implement their skills.

4. **The Digital Divide Variable:** While the "lack of laptops" emerged as a powerful qualitative theme, it was not originally a primary quantitative variable in the regression model. Future research should explicitly treat "hardware ownership" and "fellowship status" as moderating variables to see how they directly influence the relationship between technology training and learning outcomes.

Future Directions:

Future studies should adopt a **longitudinal approach**, following scholars for six months to a year after the training to see if they actually apply the statistical tools in their published research. Additionally, comparative studies between "Online" and "Residential" research methodology courses could provide deeper insights into whether the "Human Element" (meals, stay, networking) is truly the deciding factor in participant satisfaction. Finally, exploring the perspectives of the resource persons (the trainers) alongside the participants could offer a more 360-degree view of the challenges of technology-integrated research training.

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