Exploring Research Skill Development in Agricultural Doctoral Education at Kerala Agricultural University

Introduction

Doctoral education in agricultural universities is crucial for developing future researchers and educators. To meet evolving national and global knowledge needs, graduate students are expected to master and contribute to the body of knowledge (Powers & Enright, 1987; Steeg, 1984). Hartnett and Willingham (1980) emphasized that developing this ability is the most important expected outcome of higher education. However, the literature lacks consistency and clarity regarding specific skills needed for research. Students may also lack awareness of their proficiency in research skills (Veino et al., 2022). Understanding how both students and faculty assess these skills is essential for identifying strengths and gaps in doctoral training, as students' perceptions of their skills have been found to impact their learning approach, outcomes, and future applications (Balloo et al., 2016; Rossum and Schenk, 1984; Veino et al., 2022).

Conceptual Framework

This study is guided by the Research Skill Development (RSD) framework (Willison & O'Regan, 2007), constructivist learning theory (Vygotsky, 1978), and self-assessment theory (Boud & Falchikov, 1989). The RSD framework provides a structured lens for evaluating six facets of research skills: embark & clarify, find & generate, evaluate & reflect, organize & manage, analyze & synthesize, and communicate & apply. Constructivist learning theory emphasizes that research competence is constructed through active engagement, mentorship, and social interaction. Self-assessment theory highlights how students' confidence, understanding of academic standards, and scholarly experiences shape their self-evaluations. Together, these frameworks guide the analysis of how doctoral students perceive their research skills and how these perceptions align or diverge from faculty expectations.

Purpose and Research Questions

The study aimed to explore how doctoral students and faculty at Kerala Agricultural University assess research skills, with the goal of identifying areas of alignment and divergence that can inform improvements in doctoral research training. The study sought to answer the following research questions:

1. How do doctoral students at Kerala Agricultural University perceive their proficiency in key research skill areas?
2. How do faculty members assess the research skills of the doctoral students?
3. What are the key areas of alignment and divergence between student self-assessments and faculty evaluations of research skills?

Methods/Procedures

A quantitative study was conducted using a simple random sample of 50 doctoral students and 30 faculty members from the College of Agriculture at Kerala Agricultural University. The study operationalized research skills as the ability to search for, locate, extract, and use relevant information. Data was collected using structured questionnaires that measured six domains of research skills for students, including information seeking, methodology, problem solving, communication, analytical and essential research skills which was a modified version of a scale developed by Meerah et al. (2011). The same scale was modified for faculty questionnaire on

general research skills. Descriptive statistics were analyzed using weighted mean scores and a 5-point Likert scale.

Findings

Students generally rated themselves higher in communication and information seeking compared to other skill categories. For example, 80% of students reported confidence in locating information using various media, and 84% felt capable of preparing abstracts and manuscripts. However, only 28% expressed confidence in designing scientific experiments, and just 23% felt capable of constructing hypotheses and selecting appropriate statistical tests—highlighting a gap in methodological and analytical skills. In problem-solving, 46% of students reported confidence in drawing conclusions and analyzing outcomes, but fewer demonstrated the ability to logically structure research problems. These patterns are summarized in Table 1 below.

Table 1. Summary of Student Self-Assessments and Faculty Ratings

Skill Area	% Students Confident	Faculty Rating
Communication (Written)	84%	Moderate
Information Seeking	80%	Moderate
Problem Solving	46%	Moderate
Experimental Design	28%	Weak
Statistical Analysis	23%	Weak
Publishing Confidence	16%	Not Rated

While 72% reported a supportive research environment and 90% expressed satisfaction with their research experience, 84% also reported difficulty publishing their work, citing challenges with peer review and journal access. Faculty assessments aligned with these trends. While 73% of faculty rated students as having moderate research ability, only 13% rated the students as highly capable with general research skills. The faculty noted that students were strongest in communication and information seeking but weakest in analytical reasoning and experimental design.

Conclusions

The findings reveal that while doctoral students at Kerala Agricultural University possess foundational research competencies—particularly in communication and information retrieval—they lack confidence and proficiency in core research skills such as experimental design, statistical analysis, and critical evaluation. These gaps may hinder their transition from guided learners to independent researchers, especially in areas like scholarly publishing and grant writing. To address these challenges, the study recommends targeted interventions such as structured feedback mechanisms, skill-building workshops, and enhanced mentorship practices. Strengthening faculty support and improving access to research infrastructure will be essential to fostering advanced research capabilities among doctoral scholars. Future research could focus on understanding faculty and students' perceptions on the research skills and/or competencies in specific disciplines to identify any mismatches or expectations. Also, future studies could include other competencies like publication output, grant writing success or mentoring impact to improve research skill development interventions that help in producing rigorous agricultural research.

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