# Research Methods in Computing: What are they, and how should we teach them?

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#### ABSTRACT

Despite a lack of consensus on the nature of Computing Research Methods (CRM), a growing number of programs are exploring models and content for CRM courses. This report is one step in a participatory design process to develop a general framework for thinking about and teaching CRM.

We introduce a novel sense-making structure for teaching CRM. That structure consists of a road map to the CRM literature, a framework grounded in questions rather than answers, and two CRM skill sets: core skills and specific skills. We integrate our structure with a model for the process a learner goes through on the way to becoming an expert computing researcher and offer example learning activities that represent a growing repository of course materials meant to aid those wishing to teach research skills to computing students.

Our model is designed to ground discussion of teaching CRM and to serve as a roadmap for institutions, faculty, students and research communities addressing the transition from student to fully enfranchised member of a computing research community of practice. To that end, we offer several possible scenarios for using our model.

In computing, research methods have traditionally been passed from advisor to student via apprenticeship. Establishing a richer pedagogy for training researchers in computing will benefit all (see Figure 1).

#### Categories and Subject Descriptors

K.J.2 [Computers and Education]: Computer and Information Science Education—Computer science education, Information systems education, Literacy.

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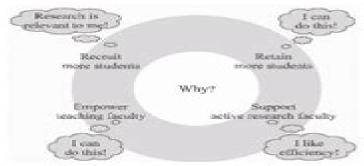


Figure 1: A richer set of options for teaching CRM benefits all the stakeholders.

#### General Terms

Experimentation, Human Factors, Design

#### Keywords

Research Methods, Situated Learning, Constructivism, Pedagogy, Learning Activities

#### 1. INTRODUCTION

Despite a lack of consensus on the nature of Computing Research Methods (CRM), a growing number of programs are exploring models and content for CRM courses with varying degrees of success [87, 84, 101, 105]. In 2005, the SIGCSE Committee on Teaching Computer Science Research Methods (SIGCSE-CSRM) [89] was founded to facilitate collaborative exploration of the content, pedagogy and curricular issues related to teaching CRM. SIGCSE-CSRM runs a lintserv, sponsors meetings at technical conferences, and hosts a Wiki [88].

On the listsery and at a Birds-of-a-feather (BOF) session at SIGCSE 2006 [41], the most frequently mentioned barriers to establishing a successful course were: (1) not being sure what material to teach, and (2) a lack of resources from which to build

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**Rachel S Tattersall** 

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algorithmization of sciences *Teaching Psychology* James Hartley, Wilbert James McKeachie, 1990 This publication is the first to cover the entire field of teaching psychology and includes teaching methods advising and curriculum planning as well as special problems in teaching laboratory and statistics courses The articles selected provide thought provoking reading for an international readership Each of twelve subject oriented sections contains a brief introduction five articles and suggested further readings for those wishing to pursue a particular topic in more detail

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