AN INTRODUCTORY GUIDE TO PUTTING RESEARCH INTO PRACTICE
4. Finding new evidence — research design

Alan Borthwick, Lisa Farndon and Jackie Campbell

Conventionally, designs for research studies are divided into two categories: quantitative and qualitative. As will be seen later, the research design used should follow from the research question and ensure that data are collected and analysed in a way that will answer that question. However, the form that the research question takes is largely a function of underlying philosophy and of why the question is being asked in the first place.

This article examines the main types of philosophical research stances as these underpin the resulting research methodologies. The main characteristics of quantitative and qualitative designs are outlined and, finally, some of the main research designs are described.

RESEARCH PHILOSOPHIES
The main models of enquiry used are the positivist and the interpretative models.

The positivist model:
- The natural science model
- Based on testing theories and hypotheses
- Insists on objectivity and neutrality – avoidance of personal bias
- Researcher controls the theoretical framework, sampling frames and the structure of the research
- Theory/concepts developed before data collection- seeks to falsify the initial hypothesis
- Favours quantitative methods

The interpretative model
- Has its roots in philosophy, history, anthropology etc
- Approach centres on interpretation and creation of meaning by human beings
- Accepts subjective reality
- Looks at understanding rather than explanation
- Context is crucial
- Researchers are reflexive, not objective
- Favours qualitative methods

QUANTITATIVE VS QUALITATIVE DESIGNS
The investigation of new knowledge can be approached in many ways. The approach taken depends on the nature and type of the research problem and the philosophical stance of the researcher (amongst other things). The most important thing, however, is that the methods should be chosen to answer the research question.

There is also a link between research designs and analytical methods. Future articles in this series will focus on

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Software Architecture For Product Families Putting Research Into Practice

Tiako, Pierre F.

Software Architecture For Product Families Putting Research Into Practice:

Software Product-Family Engineering Frank van der Linden,2004-05-24 This book constitutes the thoroughly refereed post proceedings of the 5th International Workshop on Product Family Engineering PFE 2003 held in Siena Italy in November 2003 The 36 revised full papers presented together with an introductory overview and 3 keynote presentations were carefully selected during two rounds of reviewing and improvement The papers are organized in topical sections on variation mechanisms requirements analysis and management product derivation transition to family development industrial experience evolution and decision and derivation **Software Architecture for Product Families** Mehdi Jazayeri,A. C. M. Ran,Frank van der Linden,2000 Software development organizations are now discovering the efficiencies that can be achieved by architecting entire software product families together In Software Architecture for Product Families experts from one of the world s most advanced software domain engineering projects share in depth insights about the techniques that work and those that don t The book offers a solutions oriented case study approach covering the entire development lifecycle based on advanced work done by three of Europe s leading technology companies and their academic partners Discover the challenges that drive companies to consider architecting product families and the new problems they encounter in doing so Master concepts and terms that can be used to describe the architecture of a product family then learn how to assess that architecture and transform it into working applications The authors also present chapter length real world case studies of domain engineering projects at Nokia Philips and ABB *Software Product Lines* Gary J. Chastek,2003-08-02 Software product lines are emerging as an important new paradigm for so ware development Product lines are enabling organizations to achieve impressive time to market gains and cost reductions In 1997 we at the Software Engine ing Institute SEI launched a Product Line Practice Initiative Our vision was that product line development would be a low risk high return proposition for the entire software engineering community It was our hope from the beginning that there would eventually be su cient interest to hold a conference The First Software Product Line Conference SPLC1 was the realization of that hope Since SPLC1 we have seen a growing interest in software product lines Companies are launching their own software product line initiatives product line technical and business practices are maturing product line tool vendors are emerging and books on product lines are being published Motivated by the enthusiastic response to SPLC1 and the increasing number of software product lines and product line researchers and practitioners the SEI is proud to sponsor this second conference dedicated to software product lines We were grati ed by the submissions to SPLC2 from all parts of the globe from government and commercial organizations From these submissions we were able to assemble a rich and varied conference program with unique opportunities for software product line novices experts and those in between This collection represents the papers selected from that response and includes research and experience reports *Working IEEE/IFIP Conference on Software Arhitecture* Rick Kazman,2001 The proceedings from the August 2001 conference in Amsterdam contain the abstracts of two

invited talks and 18 full papers covering a vast spectrum of topics from the essence of software architecture and its role in software engineering to issues of modeling and assessing architectures to significant achievements and industrial case studies Sections cover quality attributes and case studies product lines formal approaches representation components connectors and collaborators and patterns and tools Author index only c Book News Inc   *Software Product Lines* ,2002

   Software Product Line Abdelrahman Elfaki,2012-04-04 The Software Product Line SPL is an emerging methodology for developing software products Currently there are two hot issues in the SPL modelling and the analysis of the SPL Variability modelling techniques have been developed to assist engineers in dealing with the complications of variability management The principal goal of modelling variability techniques is to configure a successful software product by managing variability in domain engineering In other words a good method for modelling variability is a prerequisite for a successful SPL On the other hand analysis of the SPL aids the extraction of useful information from the SPL and provides a control and planning strategy mechanism for engineers or experts In addition the analysis of the SPL provides a clear view for users Moreover it ensures the accuracy of the SPL This book presents new techniques for modelling and new methods for SPL analysis

   Generative Programming and Component Engineering Gabor Karsai,2004-10-12 This book constitutes the refereed proceedings of the Third International Conference on Generative Programming and Component Engineering GPCE 2004 held in Vancouver Canada in October 2004 The 25 revised full papers presented together with abstracts of 2 invited talks were carefully reviewed and selected from 75 submissions The papers are organized in topical sections on aspect orientation staged programming types for meta programming meta programming model driven approaches product lines and domain specific languages and generation   *Design and Use of Software Architectures* Jan Bosch,2000 A practical guide to designing and implementing software architectures   *Software Product Lines* Patrick Donohoe,2012-12-06 Software product lines are emerging as a critical new paradigm for software development Product lines are enabling organizations to achieve impressive time to market gains and cost reductions With the increasing number of product lines and product line researchers and practitioners the time is right for a comprehensive examination of the issues surrounding the software product line approach The Software Engineering Institute at Carnegie Mellon University is proud to sponsor the first conference on this important subject This book comprises the proceedings of the First Software Product Line Conference SPLC1 held August 28 31 2000 in Denver Colorado USA The twenty seven papers of the conference technical program present research results and experience reports that cover all aspects of software product lines Topics include business issues enabling technologies organizational issues and life cycle issues Emphasis is placed on experiences in the development and fielding of product lines of complex systems especially those that expose problems in the design development or evolution of software product lines The book will be essential reading for researchers and practitioners alike   Software Product Lines Timo Käkölä,Juan Carlos Dueñas,2007-02-07 Between July 1999 and June 2005 a group of European companies

research institutes and universities executed the EUREKA ITEA projects ESAPS CAF and FAMILIES on the topic of product line engineering The projects originated from the need of the industry to improve software engineering performance by organizing product development in product lines The results obtained within the projects have been implemented in several large industries e g automotive e business medical systems and mobile phones They involve a radical shift in software construction and production The most important research results of the projects are collected in this book Product line engineering was already applied within industry in the 1980s and presumably earlier In the 1980s good architects in many telecommunications c panies based their architectures on the ideas of David Parnas who published on the subject of program families They were facilitated by the CHILL language widely used by the telecommunications companies This language deploys the same modularity principles as the Modula programming language family Modularity is a crucial ingredient for implementing systems with a component based architecture Being able to compose the products of components is an important mechanism in all product line architectures In the 1990s the product line ideas started to gain ground in other industries Around 1995 the company experiences reached the academia and since then people in companies and academia have collaborated widely on this subject The ESAPS CAF and FAMILIES projects manifest an institutionalized form of this collaboration   **American Book Publishing Record** ,2000-07   **Software Architecture** Flavio Oquendo,2007-09-11 This book constitutes the refereed proceedings of the First European Conference on Software Architecture ECSA 2007 held in Aranjuez Spain The 12 revised long papers presented together with four short papers cover description languages and metamodels architecture based code generation run time monitoring requirements engineering service oriented architectures aspect oriented software architectures ontology based approaches autonomic systems middleware and web services   **Software Product Lines: Going Beyond** Jan Bosch,Jaejoon Lee,2010 This volume constitutes the refereed proceedings of the 14th International Software Product Line Conference SPLC 2010 held on Jeju Island South Korea in September 2010   Model-Based Product Line Engineering (MBPLE) Marco Forlingieri,Tim Weilkiens,Hugo Guillermo Chalé-Gongora,2025-04-29 Clear and concise guide to MBPLE with industrial case studies Written in a to the point style Model Based Product Line Engineering MBPLE is the only theoretical and practical foundational book on MBPLE that brings together the topics of model based systems engineering MBSE and feature based product line engineering PLE It examines how PLE can benefit from a model based and model centric approach and in turn how MBSE combined with holistic PLE can boost model reuse and improve the MBSE business case The book combines both management and engineering aspects to deliver comprehensive coverage of the subject The book covers real life challenges and implementations of MBPLE discussing adoption obstacles faced by engineering organizations and how to overcome them to ensure a successful MBPLE deployment Dozens of SysML v2 views SysML v1 diagrams SysML v2 code snippets and illustrations are included throughout to elucidate key concepts Additional supplementary learning materials are available on a companion website Written by a

team of expert authors and contributors with significant experience in the field of applied MBPLE Model Based Product Line Engineering MBPLE discusses sample topics including Motivation for MBPLE covering document based to model based engineering project oriented to product line oriented engineering and digital continuity and system lifecycle management Foundations of MBPLE covering basic definitions the history of MBPLE recent MBPLE works and standards and the impact of MBPLE on engineering processes Implementation of MBPLE using the next generation modeling language SysML v2 Adoption of MBPLE covering investment interests company processes change management and digital transformation and methods guidelines coaching Model Based Product Line Engineering MBPLE delivers vision benefits and strategic guidance for managers executives and business leaders while serving as a practical guide for system engineers who are new to the MBPLE discipline or already familiar with it **Designing Software-Intensive Systems: Methods and Principles** Tiako, Pierre F.,2008-07-31 This book addresses the complex issues associated with software engineering environment capabilities for designing real time embedded software systems Provided by publisher **Software Product Lines in Action** Frank J. van der Linden,Klaus Schmid,Eelco Rommes,2007-06-10 Software product lines represent perhaps the most exciting paradigm shift in software development since the advent of high level programming languages Nowhere else in software engineering have we seen such breathtaking improvements in cost quality time to market and developer productivity often registering in the order of magnitude range While the underlying concepts are straightforward enough building a family of related products or systems by planned and careful reuse of a base of generalized software development assets the devil can be in the details as successful product line practice can involve organizational change business process change and technology change The authors ideally combine academic research results with industrial real world experiences thus presenting a broad view on product line engineering so that both managers and technical specialists will benefit from reading it After presenting a common framework for the description of the industrial case studies they capture the wealth of knowledge that eight companies have gathered during the introduction of the software product line engineering approach in their daily practice After reading this book you will understand all the relevant aspects regarding business architecture process and organizational issues of applying software product line engineering If you consider using a product line approach in your organization or if you want to improve your current practices you will find a rich set of useful information at your fingertips from practitioners to practitioners **Application Development and Design: Concepts, Methodologies, Tools, and Applications** Management Association, Information Resources,2017-08-11 Advancements in technology have allowed for the creation of new tools and innovations that can improve different aspects of life These applications can be utilized across different technological platforms Application Development and Design Concepts Methodologies Tools and Applications is a comprehensive reference source for the latest scholarly material on trends techniques and uses of various technology applications and examines the benefits and challenges of these computational developments Highlighting a range

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