

SSC5905 – Revisão Sistemática em Engenharia de Software

Revisão Sistemática: Conceitos Básicos

Profa. Dra. Elisa Yumi Nakagawa

elisa@icmc.usp.br

ICMC/USP – São Carlos

1. Semestre 2013

Questões preliminares

- O que é revisão sistemática?
- Por que realizar uma revisão sistemática?
- Como fazer uma revisão sistemática?

Contexto

- Engenharia de Software Baseado em Evidências (*Evidence-Based Software Engineering*):
<http://www.dur.ac.uk/ebse/>
- Origem: área de medicina
- Técnicas:
 - **Revisão Sistemática**
 - **Mapeamento Sistemático**
 - **Revisão Terciária**

Revisão Sistemática

- Uma revisão sistemática de literatura é uma forma de **estudo secundário** que utiliza uma metodologia bem definida para identificar, analisar e interpretar **todas as evidências disponíveis** a respeito de uma **questão de pesquisa** particular de maneira imparcial e repetível [Kitchenham and Charters, 2007].

Kitchenham, B. and Charters, S.: *Guidelines for performing systematic literature reviews in software engineering*. Technical Report EBSE 2007-001, Keele University and Durham University Joint Report (2007)

Tipos de Estudos

Estudo Primário

Um estudo experimental que investiga uma questão de pesquisa específica.

Estudo Secundário

Um estudo que revisa todos os estudos primários relacionados a uma questão de pesquisa específica, contribuindo para integrar/sintetizar evidências sobre a questão de pesquisa.

Mapeamento Sistemático

- Uma forma de **estudo secundário** que realiza uma ampla revisão de estudos primários em um tópico, identificando **evidências** sobre o tópico
 - Identifica **lacunas** onde novos estudos primários são necessários
 - Identifica **agrupamentos de evidências** que podem levar a novas revisões sistemáticas

Exemplo 1

- Mapeamento sistemático
 - Que abordagens de engenharia de software são aplicadas a sistemas embarcados?
- Revisão sistemática
 - Quais técnicas de modelagem têm sido utilizadas para o desenvolvimento de sistemas embarcados?

Exemplo 2

- Mapeamento sistemático
 - Quais técnicas de teste foram definidas para aplicações web?
- Revisão sistemática
 - Quais estudos comparam o teste funcional e estrutural para aplicações web?

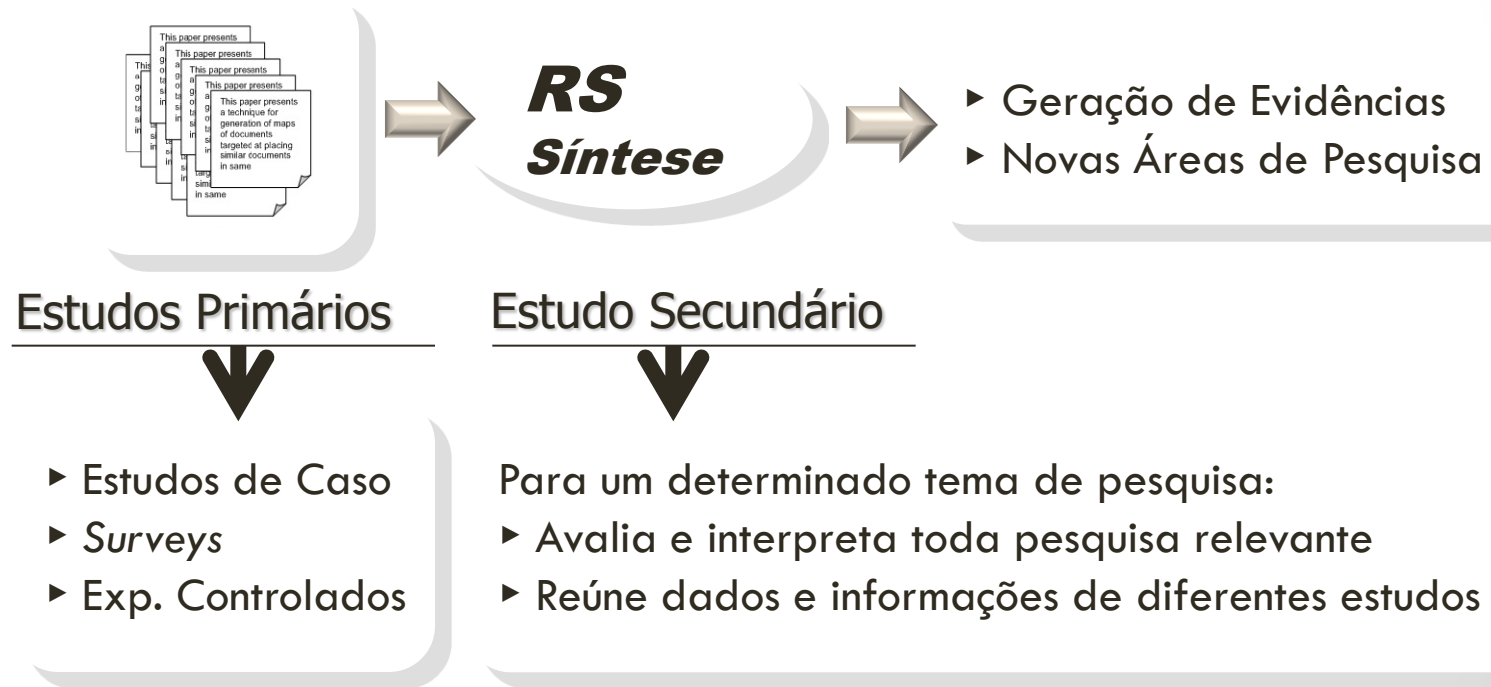
Exemplo 3

- Mapeamento sistemático
 - Quais estudos existem sobre qualidade de software no contexto de métodos ágeis?
- Revisão sistemática
 - Quais estudos aplicam a métrica de qualidade “XYX” no contexto de métodos ágeis?

Revisão Terciária

- Revisão de revisões sistemáticas
- Buscam identificar quais revisões sistemáticas foram realizadas em um determinado tópico
- Exemplos:
 - Kitchenham, B. et al. ***Systematic literature reviews in software engineering - A systematic literature review*** , Inf. Softw. Technol., 2009
 - Kitchenham, B. et al. ***Systematic Literature Reviews in Software Engineering - A Tertiary Study.*** , Inf. Softw. Technol., 2010 .

Revisão Sistemática



Motivos para RS

- Toda pesquisa inicia com uma revisão de literatura:
 - Ideal que ela esteja completa! (como saber?)
- Resumir todas as evidências sobre uma área de pesquisa
 - Exemplo: quais as limitações e benefícios do método ágil XP?
- Fornece um “framework” que apresenta os resultados atuais sobre uma determinada área de pesquisa
- Fornece subsídios para o desenvolvimento de novas áreas de pesquisa.

Características da RS

- SR inicia definindo um **protocolo de revisão**
 - Questões de pesquisa e métodos que serão adotados
- Define uma estratégia de pesquisa que visa detectar o máximo possível de trabalhos de interesse
- Documenta suas estratégias de busca, permitindo a **repetibilidade**
- Define de forma explícita os critérios para **incluir** e **excluir** os estudos primários
- Especifica as informações desejadas de cada estudo, incluindo **critérios de qualidade**

Processo de Revisão Sistemática

1. Planejamento

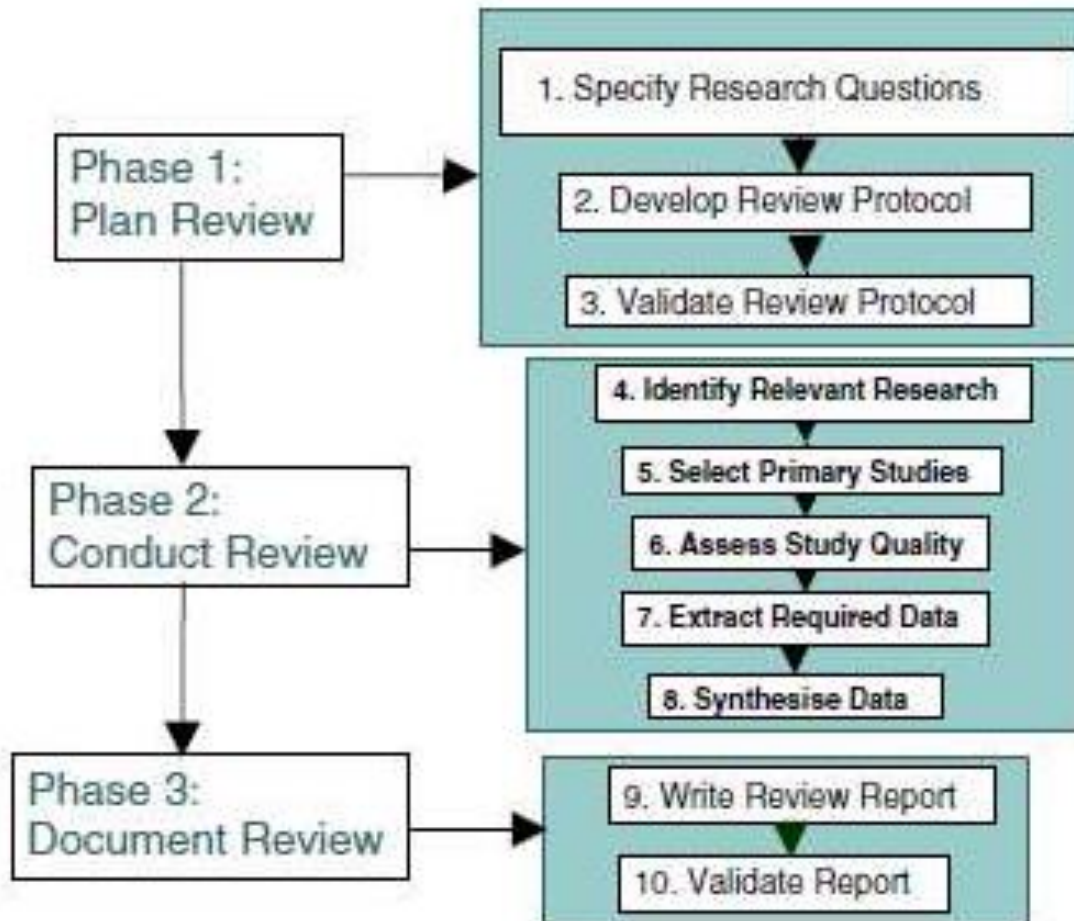
- Identificação da necessidade da revisão
- Especificação das questões de pesquisa
- Definição dos critérios de inclusão e exclusão
- Desenvolvimento de um **Protocolo de Revisão**
- Avaliação do protocolo de revisão

2. Condução

- Seleção dos estudos primários
- Extração dos dados e síntese

3. Escrita do relatório da revisão

Processo de Revisão Sistemática



- **Dificuldades ?**

Dificuldades

- Exige um esforço maior na condução
- Definição das strings de busca
 - Devem representar os estudos primários esperados
 - Devem ser adaptadas para cada máquina de busca
- Abstract, título e palavras-chaves nem sempre favorecem o processo de seleção
- A seleção de estudos primários é feita manualmente

Vantagem

- Cria uma cultura de aplicar **boas práticas** na escrita de artigos científicos

Escrita de artigos científicos

- O **título, abstract e palavras-chave** são capazes de “contar” do que se trata o artigo?
- O **abstract** está estruturado adequadamente?

Abstract Estruturado

- 1. Contexto
- 2. Objetivo
- 3. Método
- 4. Resultados
- 5. Conclusões

Exemplo/Exercício 1

- In a previous study, we reported on a systematic literature review (SLR), based on a manual search of 13 journals and conferences undertaken in the period 1st January 2004 to 30th June 2007. The aim of this on-going research is to provide an annotated catalogue of SLRs available to software engineering researchers and practitioners. This study updates our previous study using a broad automated search. We performed a broad automated search to find SLRs published in the time period 1st January 2004 to 30th June 2008. We contrast the number, quality and source of these SLRs with SLRs found in the original study. Our broad search found an additional 35 SLRs corresponding to 33 unique studies. Of these papers, 17 appeared relevant to the undergraduate educational curriculum and 12 appeared of possible interest to practitioners. The number of SLRs being published is increasing. The quality of papers in conferences and workshops has improved as more researchers use SLR guidelines. SLRs appear to have gone past the stage of being used solely by innovators but cannot yet be considered a main stream software engineering research methodology. They are addressing a wide range of topics but still have limitations, such as often failing to assess primary study quality.

Exemplo/Exercício 1

contexto



- In a previous study, we reported on a systematic literature review (SLR), based on a manual search of 13 journals and conferences undertaken in the period 1st January 2004 to 30th June 2007. The aim of this on-going research is to provide an annotated catalogue of SLRs available to software engineering researchers and practitioners. This study updates our previous study using a broad automated search. We performed a broad automated search to find SLRs published in the time period 1st January 2004 to 30th June 2008. We contrast the number, quality and source of these SLRs with SLRs found in the original study. Our broad search found an additional 35 SLRs corresponding to 33 unique studies. Of these papers, 17 appeared relevant to the undergraduate educational curriculum and 12 appeared of possible interest to practitioners. The number of SLRs being published is increasing. The quality of papers in conferences and workshops has improved as more researchers use SLR guidelines. SLRs appear to have gone past the stage of being used solely by innovators but cannot yet be considered a main stream software engineering research methodology. They are addressing a wide range of topics but still have limitations, such as often failing to assess primary study quality.

Exemplo/Exercício 1

contexto

objetivo

- In a previous study, we reported on a systematic literature review (SLR), based on a manual search of 13 journals and conferences undertaken in the period 1st January 2004 to 30th June 2007. **The aim of this on-going research is to provide an annotated catalogue of SLRs available to software engineering researchers and practitioners. This study updates our previous study using a broad automated search.** We performed a broad automated search to find SLRs published in the time period 1st January 2004 to 30th June 2008. We contrast the number, quality and source of these SLRs with SLRs found in the original study. Our broad search found an additional 35 SLRs corresponding to 33 unique studies. Of these papers, 17 appeared relevant to the undergraduate educational curriculum and 12 appeared of possible interest to practitioners. The number of SLRs being published is increasing. The quality of papers in conferences and workshops has improved as more researchers use SLR guidelines. SLRs appear to have gone past the stage of being used solely by innovators but cannot yet be considered a main stream software engineering research methodology. They are addressing a wide range of topics but still have limitations, such as often failing to assess primary study quality.

Exemplo/Exercício 1

contexto

objetivo

- In a previous study, we reported on a systematic literature review (SLR), based on a manual search of 13 journals and conferences undertaken in the period 1st January 2004 to 30th June 2007. **The aim of this on-going research is to provide an annotated catalogue of SLRs available to software engineering researchers and practitioners.** This study updates our previous study using a broad automated search. **We performed a broad automated search to find SLRs published in the time period 1st January 2004 to 30th June 2008. We contrast the number, quality and source of these SLRs with SLRs found in the original study.** Our broad search found an additional 35 SLRs corresponding to 33 unique studies. Of these papers, 17 appeared relevant to the undergraduate educational curriculum and 12 appeared of possible interest to practitioners. The number of SLRs being published is increasing. The quality of papers in conferences and workshops has improved as more researchers use SLR guidelines. SLRs appear to have gone past the stage of being used solely by innovators but cannot yet be considered a main stream software engineering research methodology. They are addressing a wide range of topics but still have limitations, such as often failing to assess primary study quality.

método

Exemplo/Exercício 1

contexto

objetivo

- In a previous study, we reported on a systematic literature review (SLR), based on a manual search of 13 journals and conferences undertaken in the period 1st January 2004 to 30th June 2007. **The aim of this on-going research is to provide an annotated catalogue of SLRs available to software engineering researchers and practitioners.** This study updates our previous study using a broad automated search. **We performed a broad automated search to find SLRs published in the time period 1st January 2004 to 30th June 2008. We contrast the quality and source of these SLRs with SLRs found in the original manual search.** **Our manual search found an additional 35 SLRs corresponding to 33 unique studies. Of these papers, 17 appeared relevant to the undergraduate educational curriculum and 12 appeared of possible interest to practitioners. The number of SLRs being published is increasing. The quality of papers in conferences and workshops has improved as more researchers use SLR guidelines. SLRs appear to have gone past the stage of being used solely by innovators but cannot yet be considered a main stream software engineering research methodology. They are addressing a wide range of topics but still have limitations, such as often failing to assess primary study quality.**

método

resultados

Exemplo/Exercício 1

contexto

objetivo

- In a previous study, we reported on a systematic literature review (SLR), based on a manual search of 13 journals and conferences undertaken in the period 1st January 2004 to 30th June 2007. **The aim of this on-going research is to provide an annotated catalogue of SLRs available to software engineering researchers and practitioners.** This study updates our previous study using a broad automated search. **We performed a broad automated search to find SLRs published in the time period 1st January 2004 to 30th June 2008. We contrast the quality and source of these SLRs with SLRs found in the original manual search.** The manual search found an additional 35 SLRs corresponding to 33 unique studies. Of these papers, 17 appeared relevant to the undergraduate educational curriculum and 12 appeared of possible interest to practitioners. The number of SLRs being published is increasing. The quality of papers in SLR workshops has improved as more researchers use SLR guidelines. **SLRs appear to have gone past the stage of being used solely by innovators but cannot yet be considered a main stream software engineering research methodology. They are addressing a wide range of topics but still have limitations, such as often failing to assess primary study quality.**

método

resultados

conclusões

Para exercitar

- Software engineering researchers solve problems of several different kinds. To do so, they produce several different kinds of results, and they should develop appropriate evidence to validate these results. They often report their research in conference papers. I analyzed the abstracts of research papers submitted to ICSE 2002 in order to identify the types of research reported in the submitted and accepted papers, and I observed the program committee discussions about which papers to accept. This report presents the research paradigms of the papers, common concerns of the program committee, and statistics on success rates. This information should help researchers design better research projects and write papers that present their results to best advantage.

Exercício 2

- Resumo estruturado:
 - Escolha um resumo de artigo e um resumo de monografia/tese:
 - se for aluno de doutorado, utilizar o resumo da dissertação de mestrado.
 - se for aluno de mestrado, justificar a escolha.
 - Analise se a estrutura contempla todos os elementos de um resumo: contexto, objetivo, métodos, resultados e conclusões.
- Apresentar na próxima aula!!

Exercício 3

- Leitura e síntese do artigo
 - Kitchenham, B. et al. ***Systematic Literature Reviews in Software Engineering - A Tertiary Study***. Information and Software Technology, Volume 52, Issue 8, August 2010, Pages 792–805.
 - Entrega: Próxima aula!!