



# Formal comparison of methods

Session 6b  
25 February 2019

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# Outline

- We are standing on the shoulders of giants...
  - Method engineering
  - Creation of methods
  - Tool support
  - Method comparison
- ...but do not always agree with each other

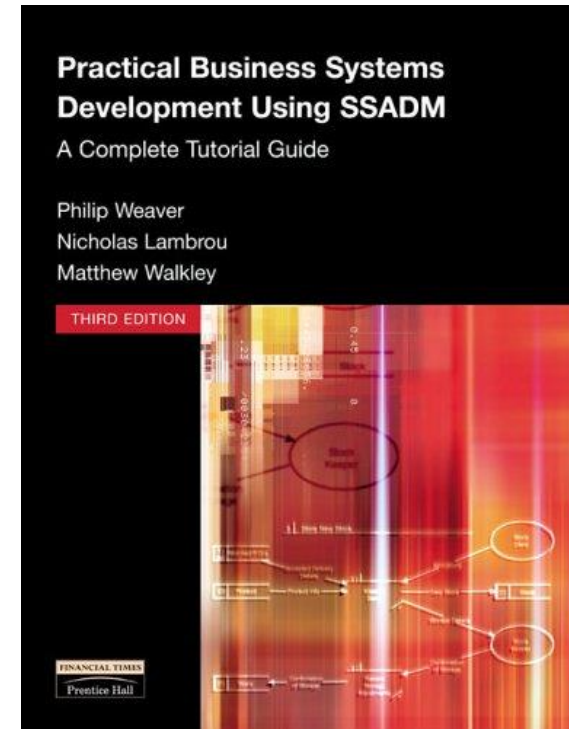
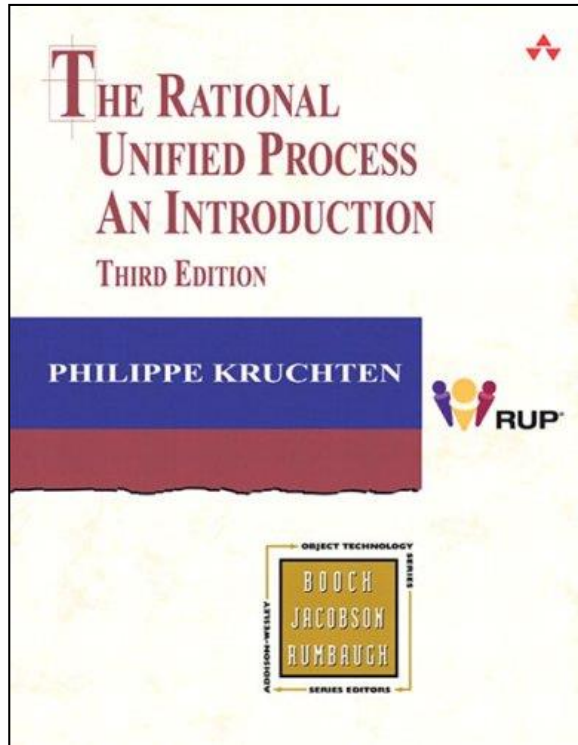


# Some questions

- Which method for the development of information systems is better?
  - Should we change our standard method?
  - Which technique is better suited for this application?
  - What tool should we select to support this method/technique?
- 
- All these questions involve some kind of comparison.
  - The objective of this lecture is to provide a theory of an objective method comparison based on method engineering principles.



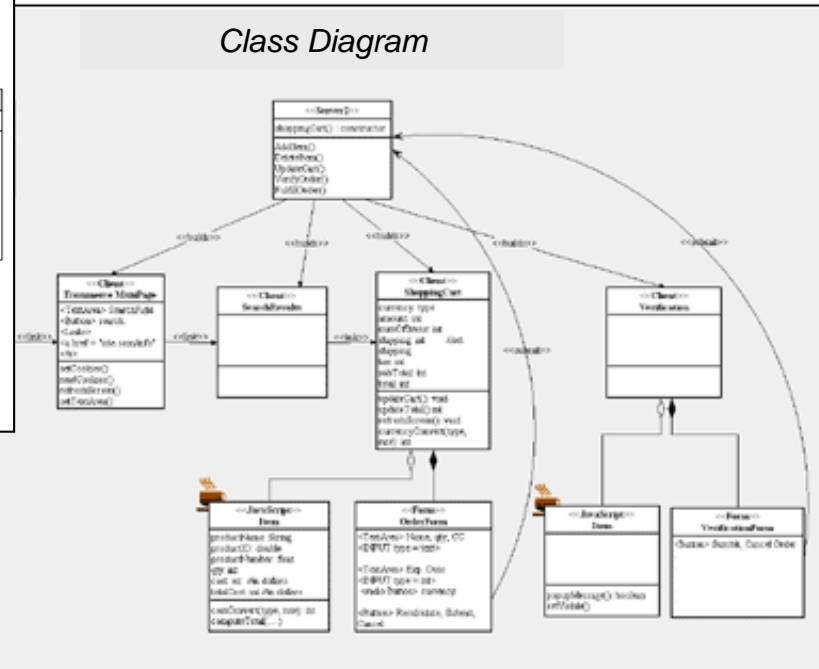
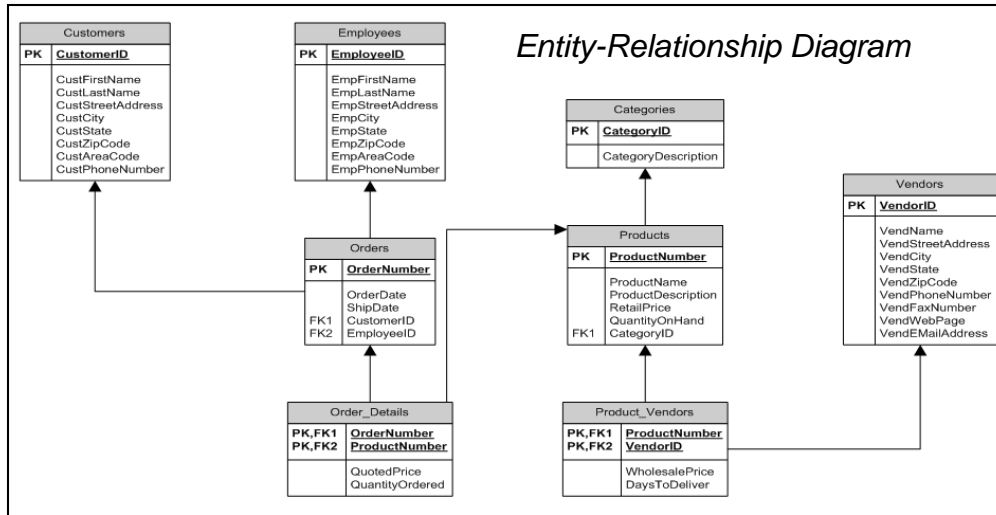
# Comparison of methods



Rational Unified Process versus  
Structured Systems Analysis and Design Method



# Comparison of techniques



Entity Relationship Diagram versus Class Diagram

# Evaluation criteria

- **Effectiveness**: method adequately suited for the communication with the team and the customer
- **Efficiency**: method executed within time and budget
- **Execution**: more deliverable content per time unit
- **Correctness**: less error repairs per deliverable
- **Satisfaction**: better acceptance by users and customers
- **Learnability**: faster or simpler to learn



# Dilemma of comparison

- How can methods be measured in a **scientific valid** way?
- This means, the comparison should be **independent from**:
  - performers
  - domain
  - technology
  - project situation
  - experience
- Arrangement of large field studies or laboratory tests are unfeasible



# 4-DAT evaluation framework

- 4-DAT (4D Analytical Tool) evaluation framework
- Assessment of 4 degrees of agility for existing or about-to-constructed methods
- Partly qualitative and quantitative
- 4 dimensions:
  - Method scope
  - Agility characterization
  - Agile value characterization
  - Software process characterization

*(Qumer & Henderson-Sellers, 2006)*





# DAT-dimensions (excerpt)

## Dimension 1 (Method Scope)

### Scope

1. Project Size

### Description

Does the method specify support for small, medium or large projects (business or other)?

2. Team size

Does the method support for small or large teams (single or multiple teams)?

3. Development style

Which development style (iterative, rapid) does the method cover?

4. Code style

Does the method specify code style (simple or complex)?

5. Technology environment

Which technology environment (tools, compilers) does the method specify?

6. Physical environment

Which physical environment (co-located or distributed) does the method specify?

7. Business culture

What type of business culture (collaborative, cooperative or non-collaborative) does the method specify?

8. Abstraction mechanism

Does the method specify an abstraction mechanism (object-oriented, agent-oriented)?

## Dimension 2 (Agility Characterization)

### Features

1. Flexibility

### Description

Does the method accommodate expected or unexpected changes?

2. Speed

Does the method produce results quickly?

3. Leanness

Does the method follow the shortest time span, use economical, simple and quality instruments for production?

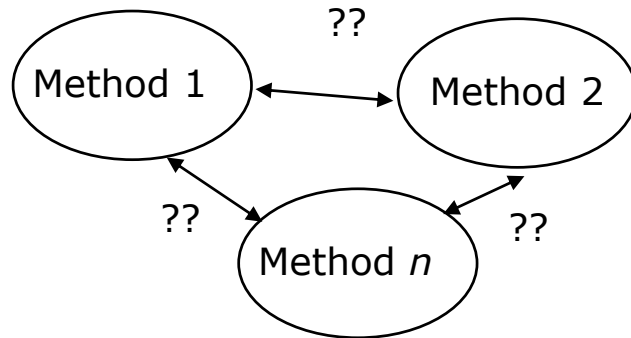
4. Learning

Does the method apply updated prior knowledge and experience to create a learning environment?

5. Responsiveness

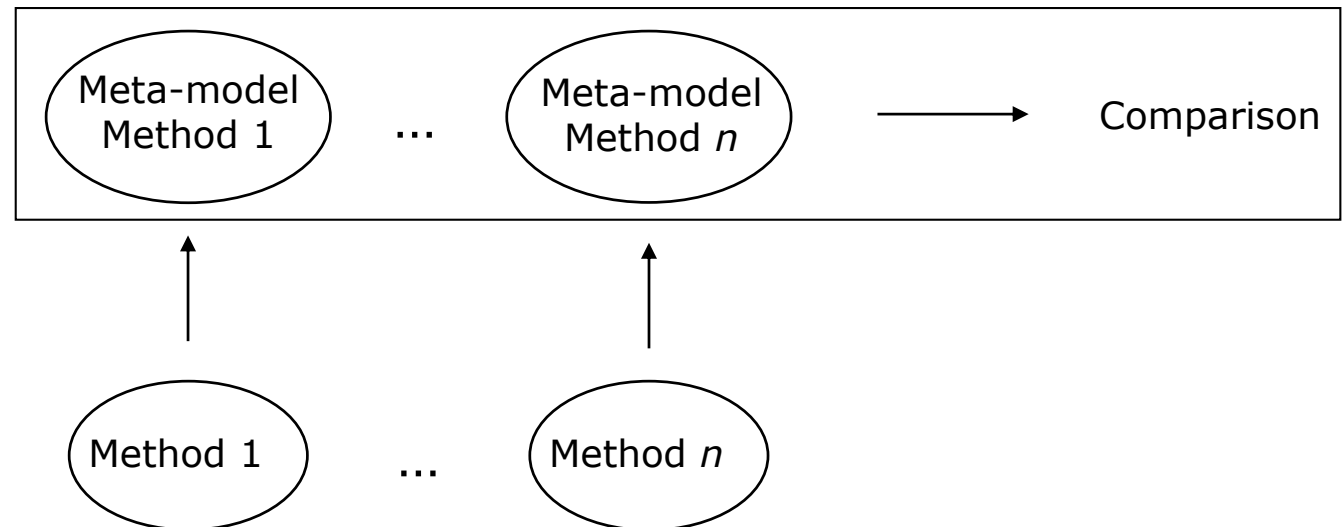
Does the method exhibit sensitiveness?

# Formal comparison



How to compare more than 2 methods?

Arrangement of the comparison

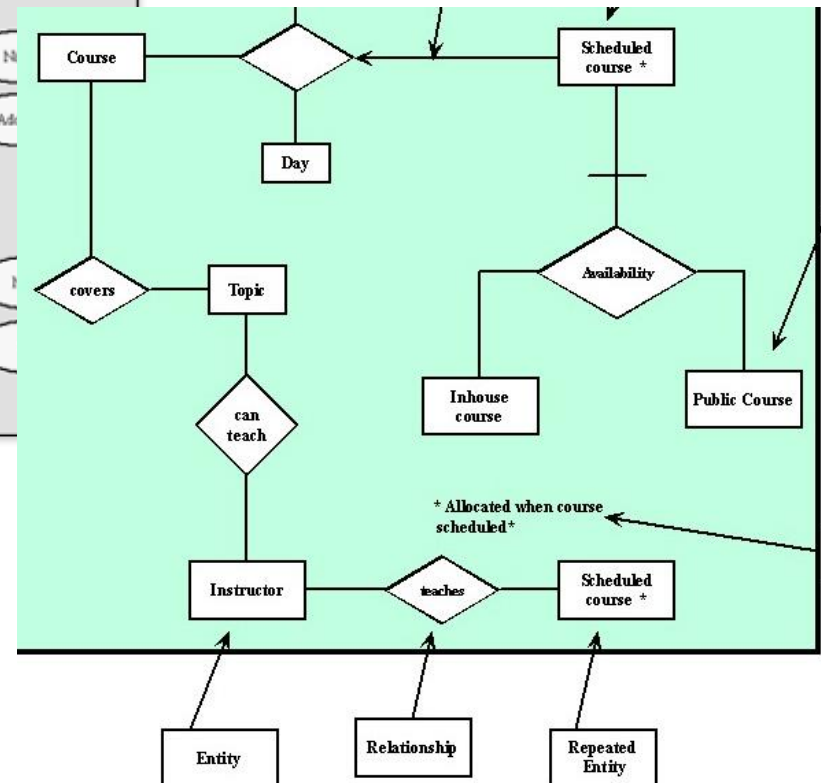
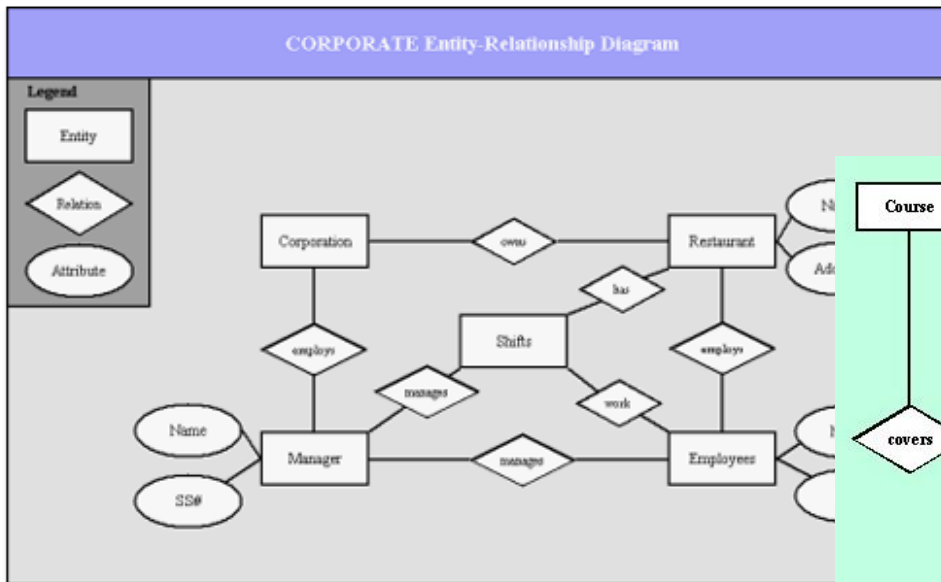


# Meta-models

- Usage of meta-models for comparison
- Meta-data models
  - Concepts, associations, properties, ...
- Meta-process models
  - Activities, sub-activities, roles, ...

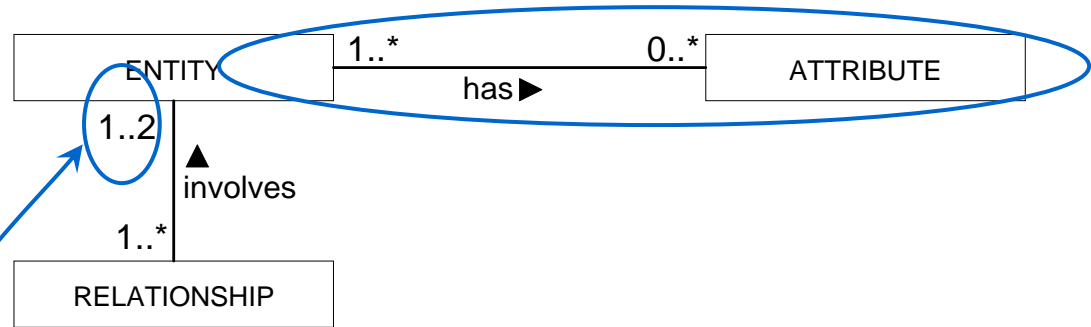


# Example (1)

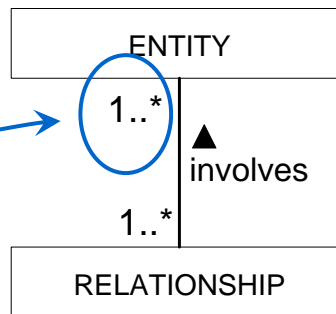


## Example (2)

Binary ERD with  
attributes



N-ary ERD without  
attributes



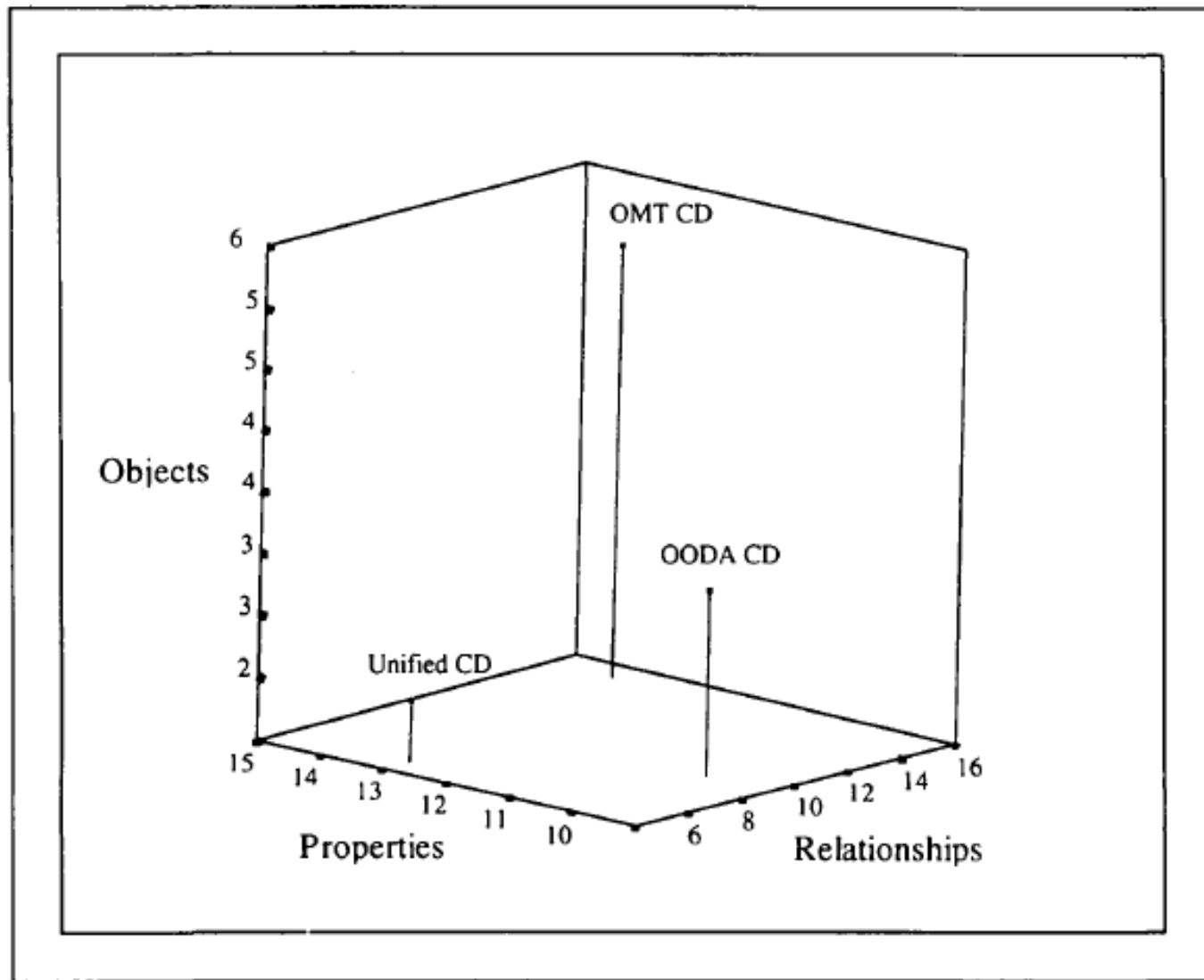
# Metrics of meta-models

- Modeling the techniques in OPRR language (Object, Property, Relationship, Role)
- OPRR is the meta-model behind the Meta-Edit tool.
- Analysis of the techniques
  - **Count** of object types, relationship types and property types
  - **Aggregate metrics** to measure complexity based on the above counts

*Rossi and Brinkkemper (1997)*







**Figure 5.** Technique cube





# Conceptual differentiation of meta-models

Comparison based on conceptual differentiation of meta-models (*Hong, Goor & Brinkkemper (1993)*)

Process:

1. Method selection
2. Method characterization
3. Meta-modeling
4. Creation of a super-method
5. Method comparison

Extensions (*van de Weerd, de Weerd & Brinkkemper (2006)*)

*Use of the PDD as meta-modeling language*

*Use of activity and concept tables*

*Amanatiadou & van de Weerd (2009)*

*Comparing methods of companies with similar situational factors in order to identify different routes*



# Execution of the comparison process

1. Method selection
2. Characterization of the chosen methods
3. Meta-modeling
  - Meta-process models
  - Meta-data models
4. Creation of a **super-method**
5. Method comparison
  - Activities
  - Concepts
  - (Techniques)



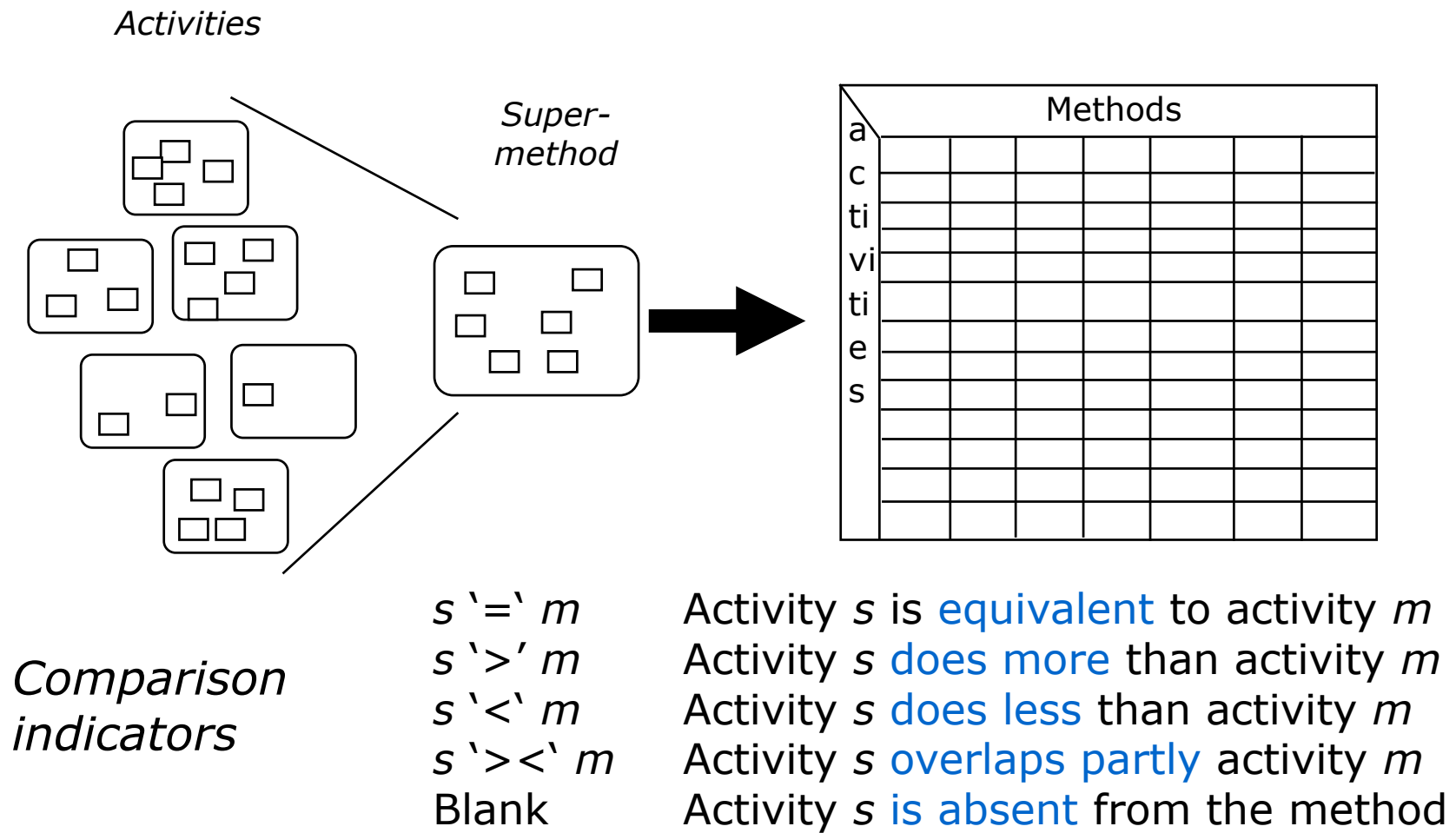
# Super-method

- The super-method is a kind of smallest common denominator of the methods in the study,  
i.e.  
a method which contains all activities and concepts that appear in *at least one* of the methods

**Note:** in the paper of Hong et al. the super-method is called supermethodology, because it was published in the US



## Comparison of activities

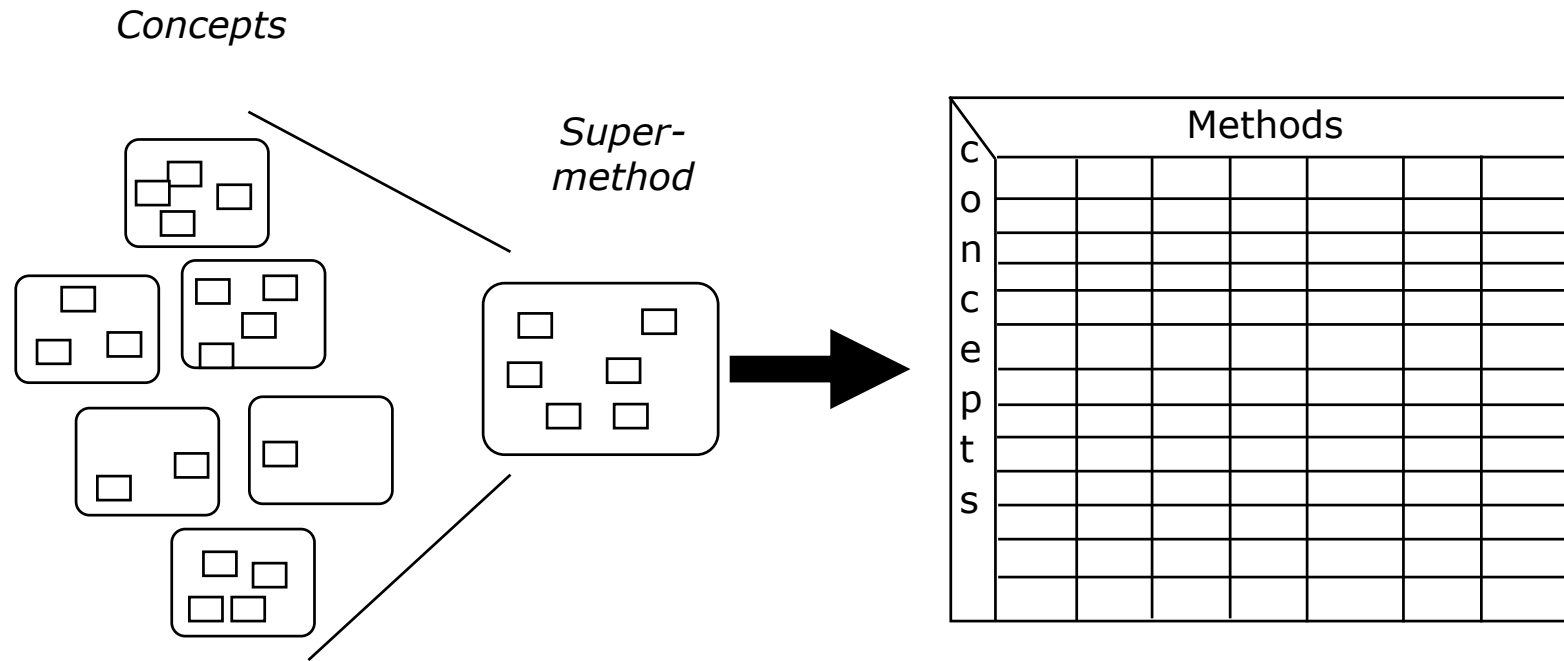


# Activity comparison

2. Preproduction Phase	GD&P	ITGD	TGPH	Zylom
2.1 Create game design				
2.1.1 Brainstorm	=			
2.1.2 Delegate design	=			
2.1.3 Write game design document	=	>		=
2.1.4 Evaluate game design document				=
2.1.5 Write technical design document	=	><		<
2.1.6 Create visualizations				=
2.1.7 Present game design				=
2.1.8 Evaluate technology			=	
2.1.9 Define tools and pipeline			=	
2.1.10 Create documentation			=	



# Comparison of concepts



## Comparison indicators

*s* := *m*  
*'string'*

Concept  $s$  is **equivalent** to concept  $m$   
 Concept  $s$  is **equivalent** to concept  $m$   
 but the term '*String*' is used.



# Concept comparison

2. Preproduction Phase	GD&P	ITGD	TGPH	Zylom
<i>2.1 Create game design</i>				
2.1.1 GAME DESIGN DOCUMENT	=	=	DESIGN DOC.	=
2.1.2 CORE GAMEPLAY	=			
2.1.3 CONTEXTUAL GAMEPLAY	=			
2.1.4 STORY	=			
2.1.5 TECHNICAL DESIGN DOCUMENT	=	=	TECHNICAL DOC.	=
2.1.6 REQUIREMENT	ASSET	FEATURE	FEATURE	ASSET
2.1.7 VISIBLE REQUIREMENT	=			
2.1.8 NONVISIBLE REQUIREMENT	=			
2.1.9 FEATURE LIST			=	ASSET LIST
2.1.10 DOCUMENTATION			=	
2.1.112 PROTOTYPE				=



# A reference method for game production

- Master's thesis research Stefan de Weerd
- Duration: 7 months (2006/2007)
- Domain: professional game production
- 3 books for game development
- Zylom case study

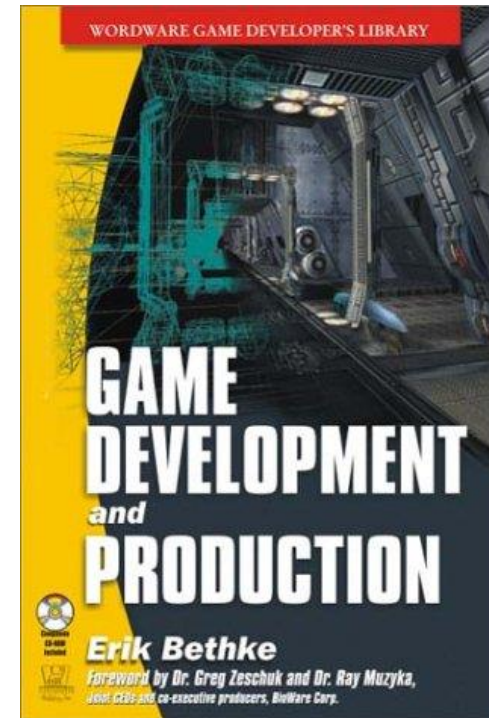




# Game development and production

*Eric Bethke, 2003*

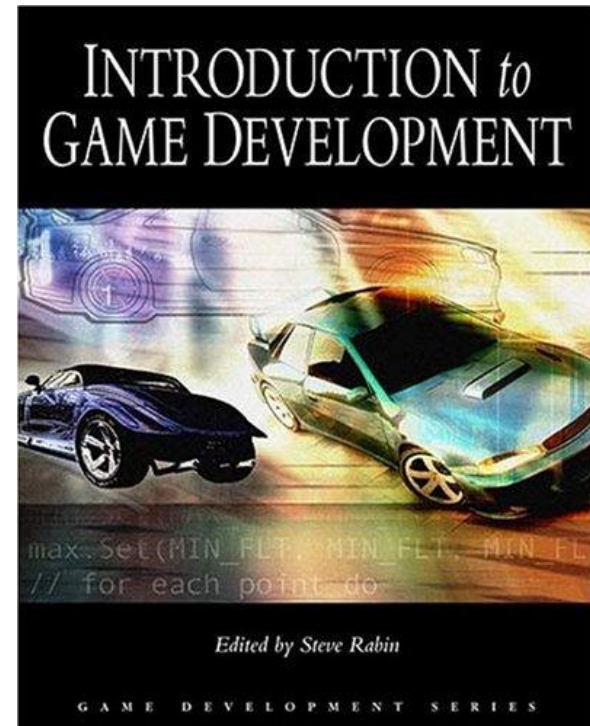
- Focus
  - Deliverables
  - Practical issues
  - Management support



# Introduction to game development

*Steve Rabin, 2005*

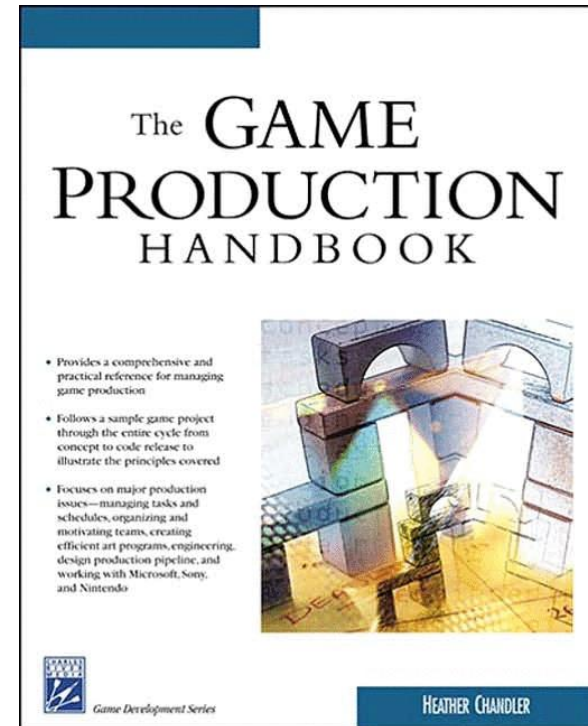
- Focus
  - Game implementation
  - Technical issues



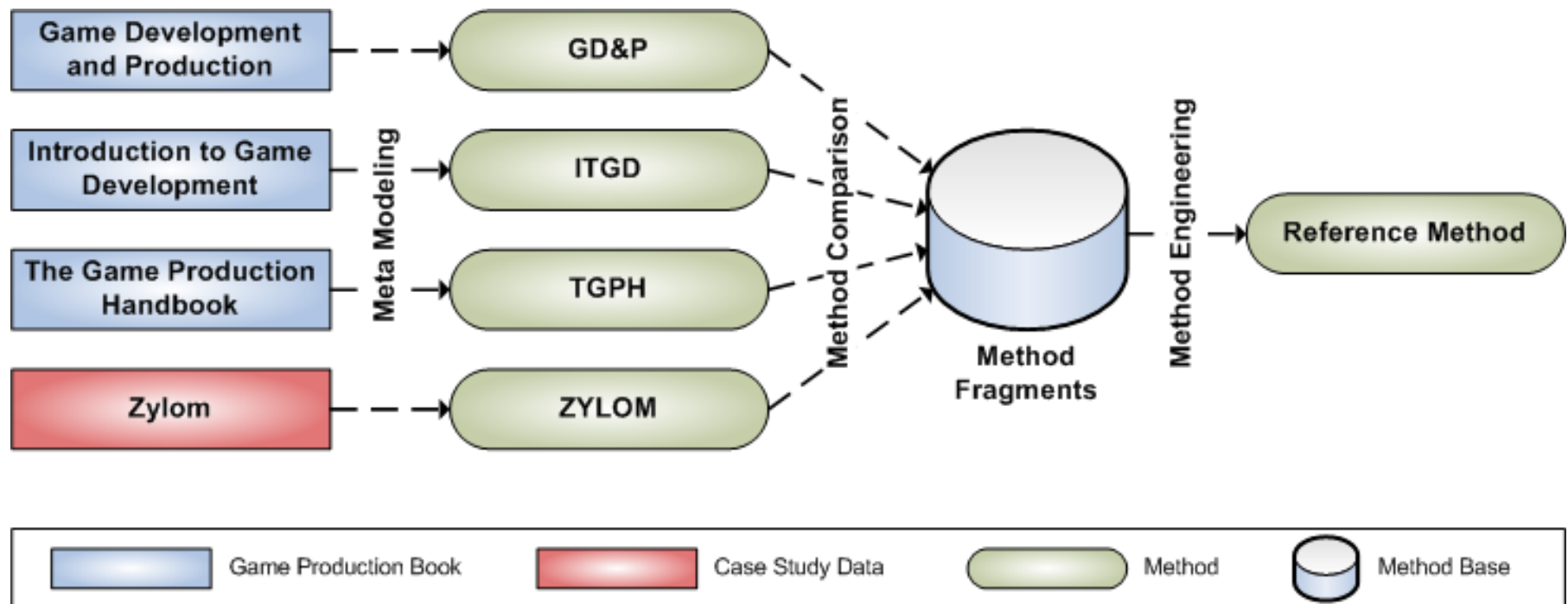
# The game production handbook

*Heather Chandler, 2006*

- Focus
  - Development process
  - Templates and deliverables

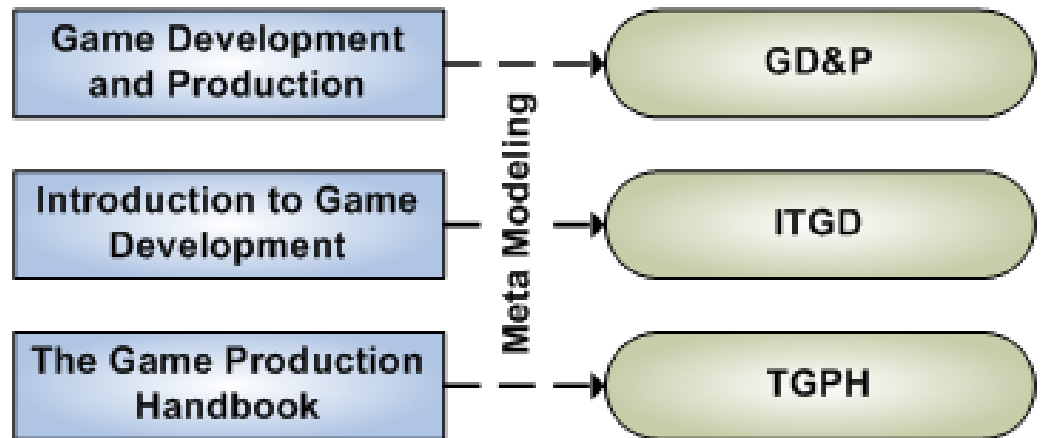
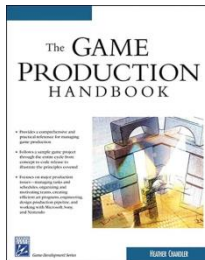
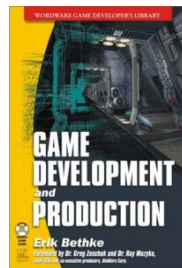
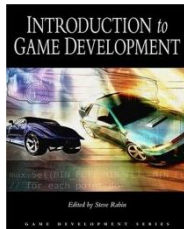


# Approach

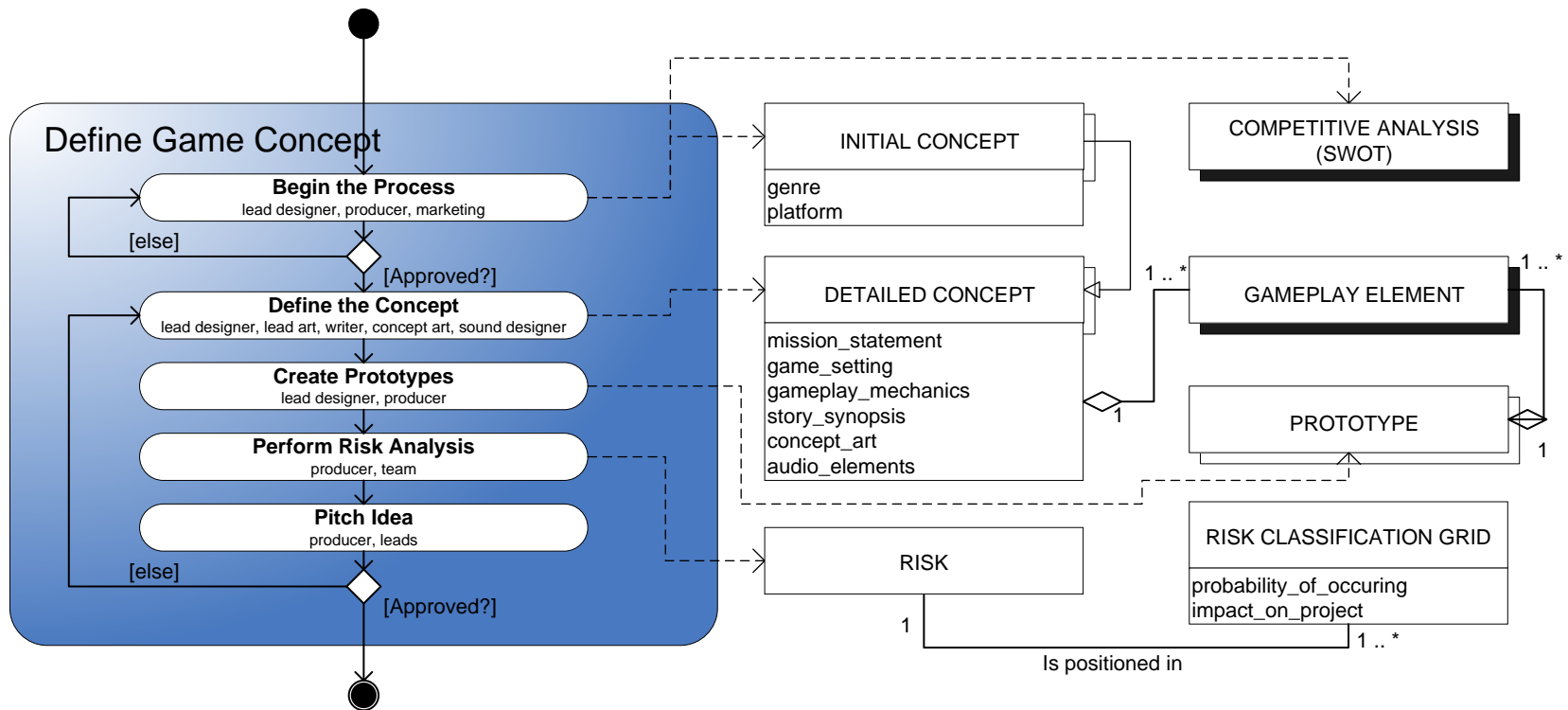


# Literature analysis

- 3 books on Game Production
  - Translate theory into process deliverable diagrams using meta modeling



# TGPH – Process-deliverable diagram



Process-deliverable diagram of the Concept Phase in  
“The Game Production Handbook”



# TPGH – Activity table

Activity	Sub-Activity	Description
<b>Define Game Concept</b>	Begin the Process	At the start of the process, the Lead designer, Producer and Marketing manager develop an INITIAL CONCEPT for the new game. In the INITIAL CONCEPT the genre and platform on which the game is supposed to run are described. They also perform a COMPETITIVE ANALYSIS.
	Define the Concept	When the INITIAL CONCEPT is approved, the Lead designer, Lead art, Writer, Concept art, and Sound designer define the concept in a DETAILED CONCEPT.
	Create Prototype	The Lead designer and Producer create a PROTOTYPE, based on the DETAILED CONCEPT.
	Perform Risk Analysis	The Producer develops together with the rest of the Team a RISK CLASSIFICATION GRID, in which all RISKS are plotted.
	Pitch Idea	The Producer and Lead pitch the idea to the management. When it is approved, they can carry on with defining the game requirements.

# TPGH – Concept table

Concept	Definition
<b>INITIAL CONCEPT</b>	A not too detailed concept of the game that needs to present a compelling goal for the game to achieve.
<b>DETAILED CONCEPT</b>	A definition of the concept of a game that specifies the game mechanics, setting, characters, storyline, and major features.
<b>COMPETITIVE ANALYSIS (SWOT)</b>	An identification of the strengths and weaknesses of your game's competition, market opportunities for your game, and any threats that might impact the game's success in the market.
<b>GAMEPLAY ELEMENT</b>	A type of information defined in the detailed concept, like mission statement, game setting, gameplay mechanics, story synopsis, concept art, and audio elements.
<b>PROTOTYPE</b>	An original type, form, or instance serving as a basis or standard of the full game for later stages.
<b>RISK CLASSIFICATION GRID</b>	The result of performing risk analysis, where risks have been identified, analyzed and classified on probability of occurring and impact on the project.



# Results

- Method fragments stored in method base
- Literature analysis statistics:

	<b>GD&amp;P</b>	<b>ITGD</b>	<b>TGPH</b>
Activities	6	10	9
Sub activities	23	37	36
Concepts	36	42	49



# Case study

Partner: Zylom Media Group B.V.

- Casual games
  - Development
  - Publishing
- Founded in 2001, Eindhoven
- More than 60 employees
- 10 M unique visitors a month



**zylom**<sup>®</sup>  
Have fun.





**zylom®**  
Have fun.

Andere taal / Other language

FUNPASS

SPELEN

DOWNLOADEN

HELP

Alle spellen Kaart Puzzel Woord Mahjong 3-op-een-rij Zoek en Vind Actie Speel en Win

Lid worden | Inloggen | Inlognaam en/of wachtwoord vergeten?

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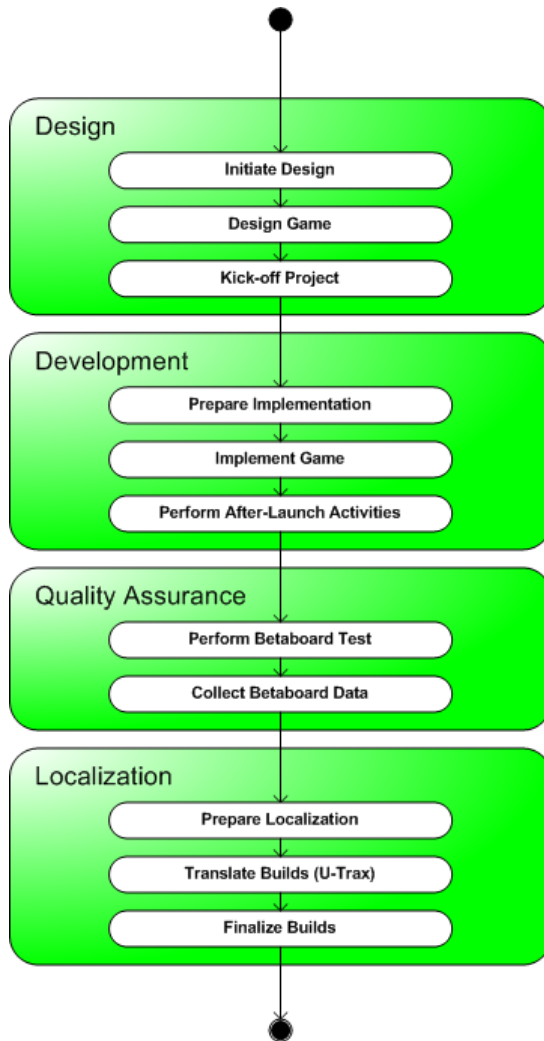
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# Case study approach

- 15 Interviewees
  - Collecting information
  - Reviewing draft versions
- Company documents
- Case study tactics (Yin, 2003)
- Information → Process deliverable diagrams



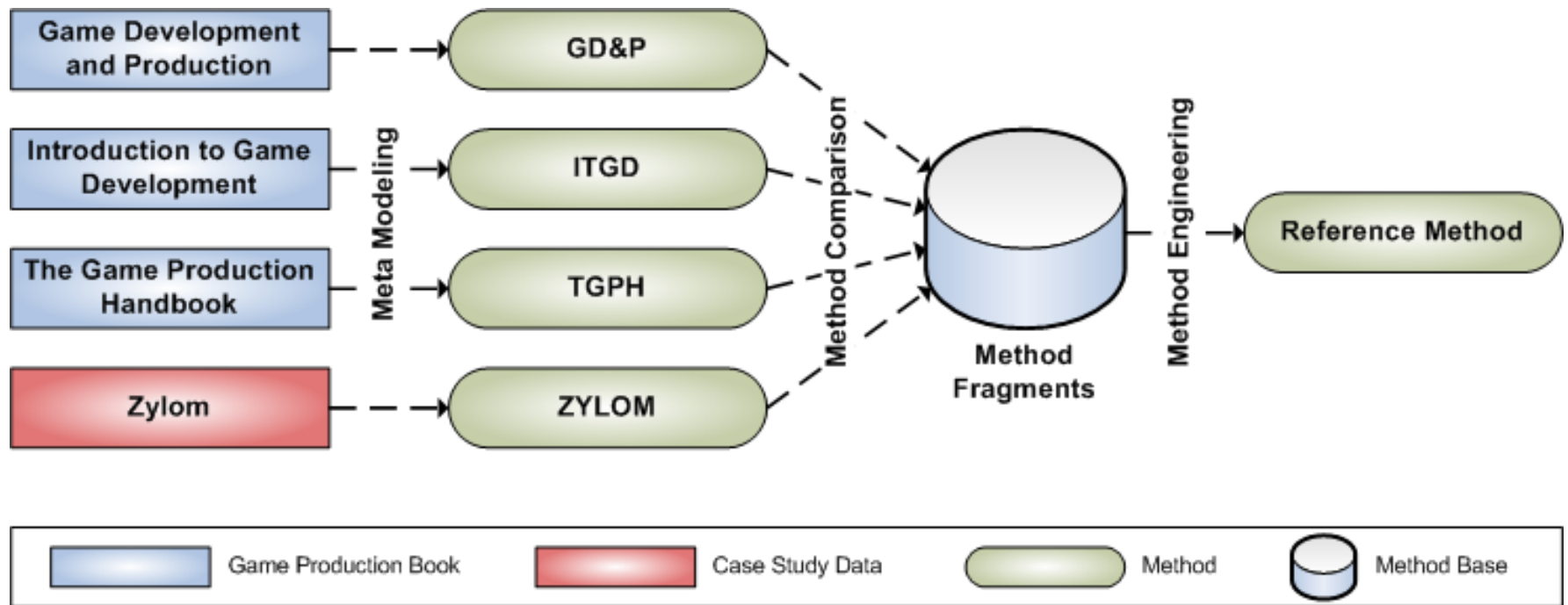
# Case study details



- 4 phases:  
design, development, quality assurance and localization
- 11 activities
- 59 sub activities
- 60 concepts



# Approach





# Comparison

- Define 'super-method'
  - All activities and concepts in books and at Zylom
- Compare all four methods to super-method
  - Activity from super-method is available?
  - Activity from super-method does more or less?
  - Concept from super-method is available?
  - Concept from super-method has same name?



# Activity comparison

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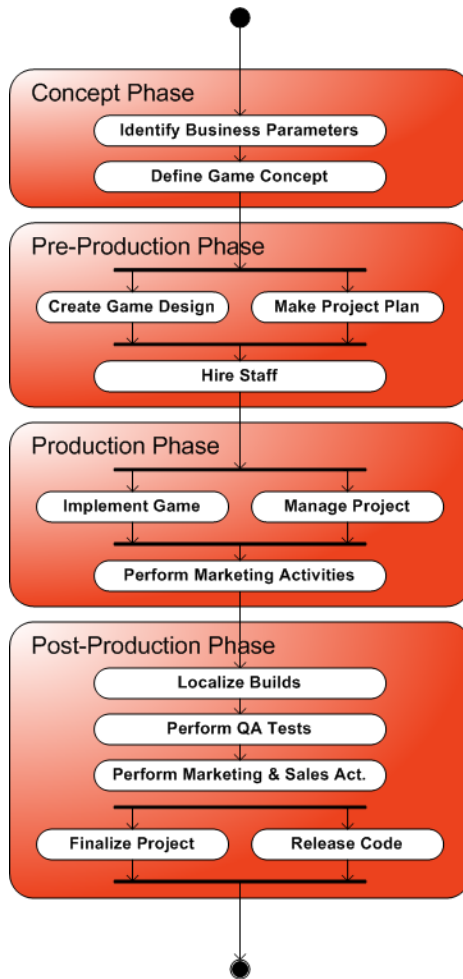


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# Reference method



- Complete process
- Selection of all *relevant* method fragments
- So, the reference is a subset of the supermethod, which can be tailored to fit each situation.
- Result:
  - 13 main activities
  - 69 sub activities
  - 93 deliverables



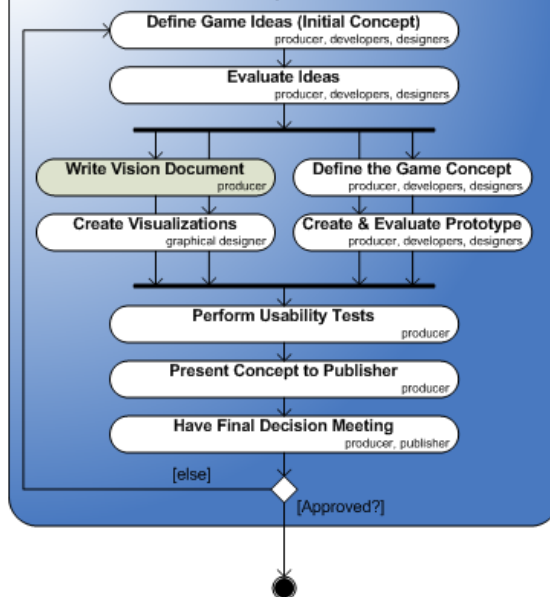
## Game Production Reference Method

You are here: >> [Home](#) > [Concept Phase](#) > [Define Game Concept](#) > [Write Vision Document](#)



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### Define Game Concept



### Description

Write Vision Document results in a VISION DOCUMENT

For more information, see [Game Development and Production \(2003\) Bethke, E. \(Eds.\)](#)

### Deliverables

An executive summary of the game design document that touches upon all the key features of the game in such a manner to grab them and get them to request to see the game demo and move forward with a deal.



# Conclusions

- Reference method for game production
  - Uniform terminology
- Process improvements for Zylom
- Improvements of method comparison approach (Hong et al., 1993) by using activity and concept tables
- Public knowledge infrastructure



# QUESTIONS?



# References

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