**Symposium on 21st Century
Teaching Technologies:**
*A Continuing Series of Explorations
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*Development of Web-Based Courses:
A Software Engineering Approach*

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Contents of the presentation

- Motivation
- Objectives of the research
- Research methodology
- Main results
  - **A conceptual of a web-based course**
  - **A method for developing web-based courses**
- Conclusions

- There many software tools for creating web-based courses
  - **E.g., CourseInfo and WebCT**
- But there are very few methods that explain how to create a high quality and effective web-based course
- Using a tool must be preceded by more important activities, such as:
  - **The analysis of instructional requirements**
  - **The design of the content, structure, interaction, and interface of the course**
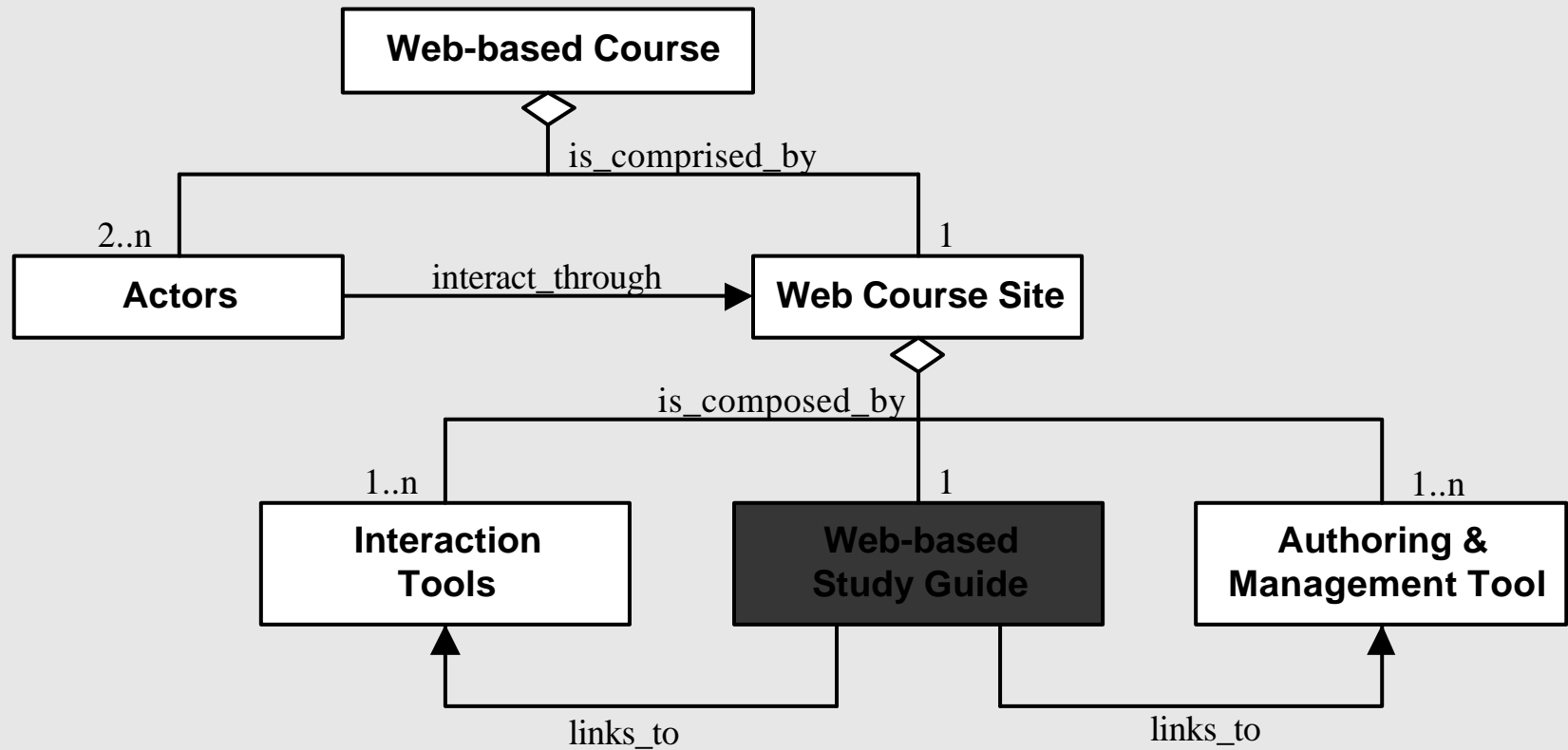
- To demonstrate that Software Engineering could be successfully applied to the development of web-based courses.

- This hypothesis was proven by:
  - **building a software engineering based method for developing web-based courses**
  - **using the method to create several web-based courses**

- An integration process was applied to design the method
- We integrated principles, models, and methods from:
  - **Instructional System Design**
  - **Hypermedia**
  - **Object-Oriented Software Engineering**
- A conceptual model of web-based courses was created first
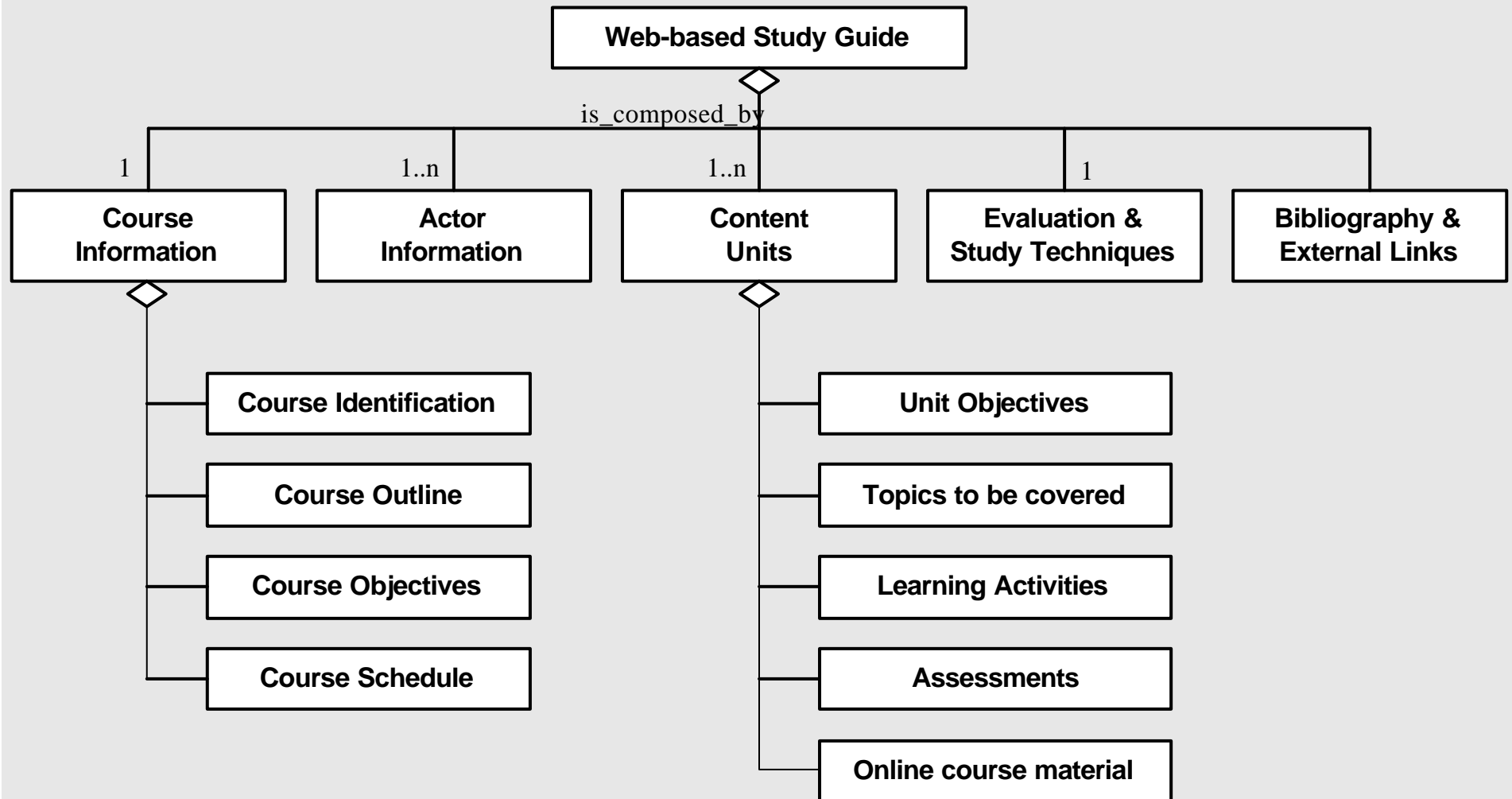 - **It provided a conceptual framework for designing the method**

- A web-based course is an online course that applies the WWW technology to facilitate a teaching-learning process
- Key features:
  - **Provides content, information, and directions through web pages**
  - **Facilitates three forms of interaction:**
    - student- instructor
    - student-content
    - student-student
  - **Provides access to collaborative tools for facilitating the interaction**
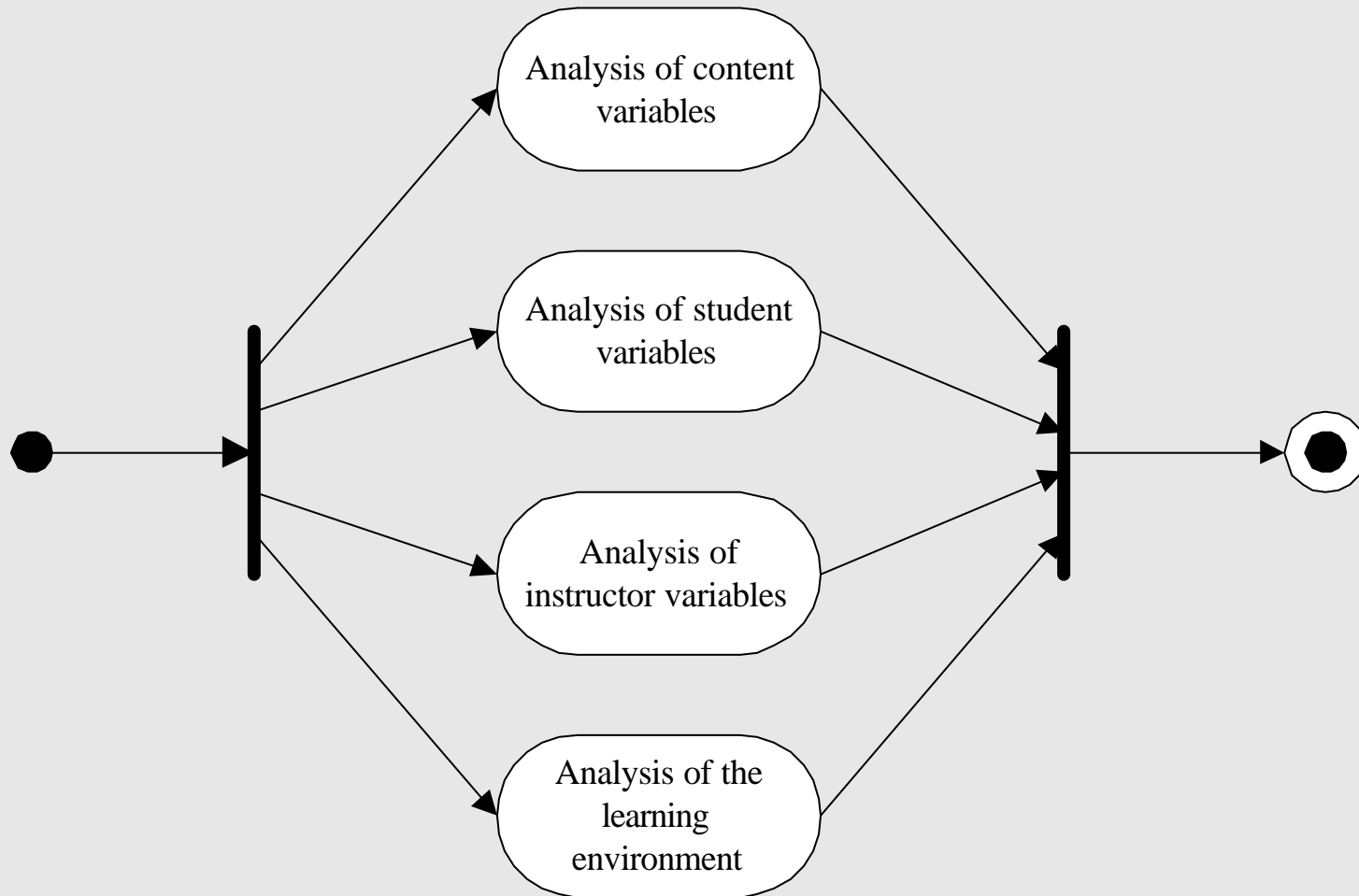   - E.g., E-mail, videoconference, discussion lists, chat, electronic whiteboards, etc.

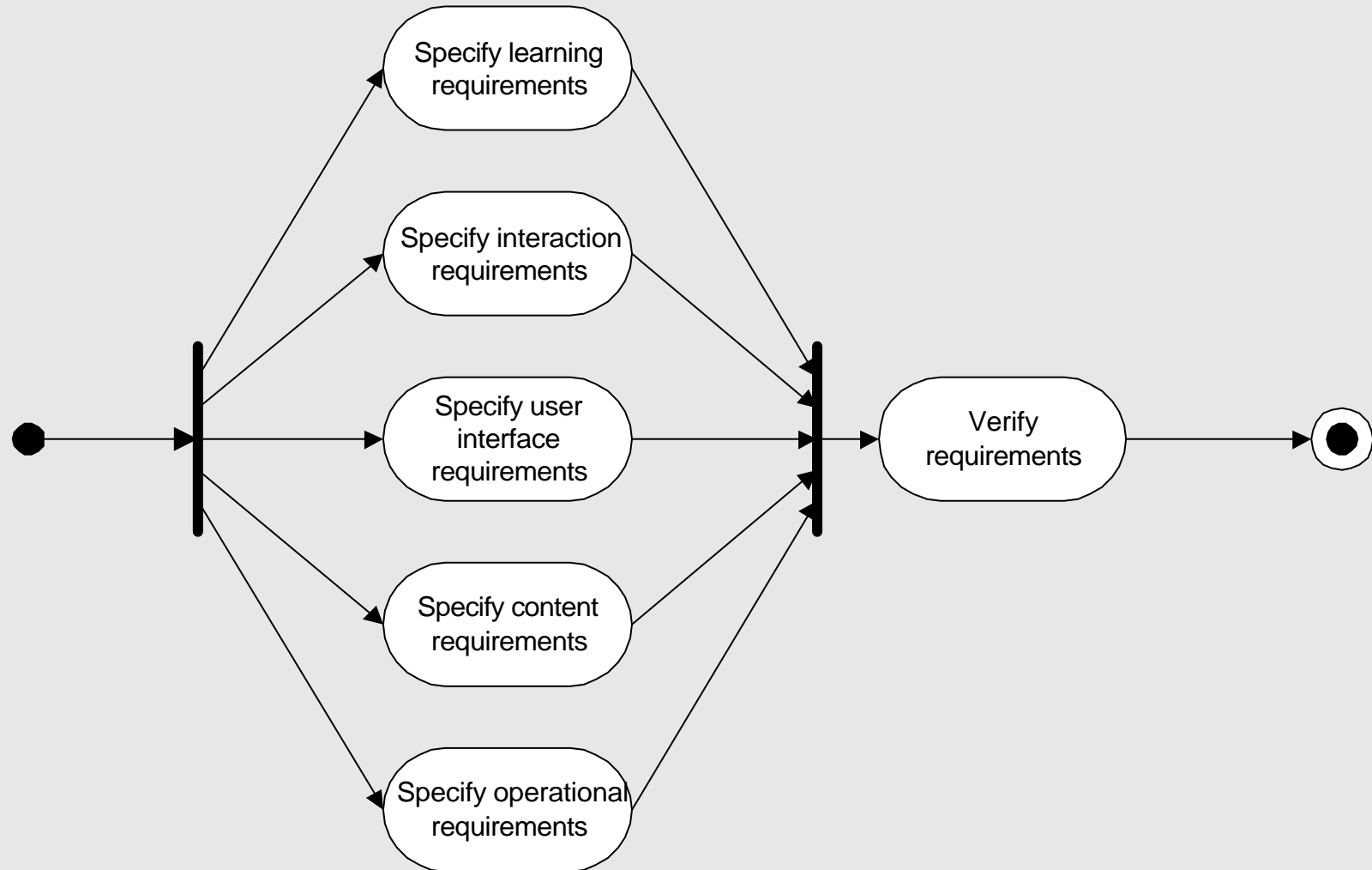*A conceptual model of a web-based course*
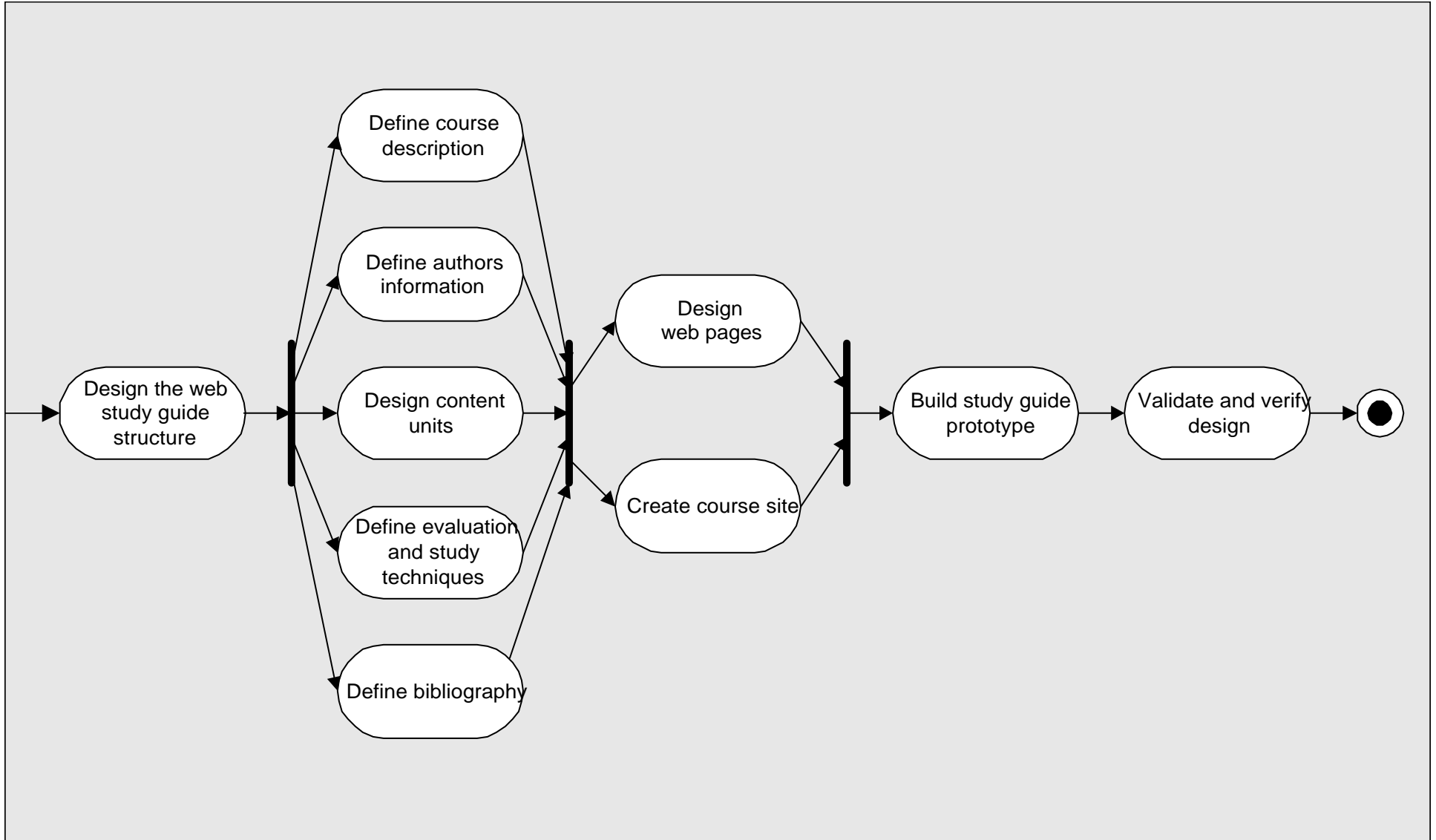
A conceptual model of a web-based course

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                          ┌─────────────────────────┐
                          │  Web-based Study Guide   │
                          └─────────────────────────┘
                                      ◇
                              is_composed_by
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1	1..n	1..n	1	
Course Information	**Actor Information**	**Content Units**	**Evaluation & Study Techniques**	**Bibliography & External Links**

Course Information ◇
- **Course Identification**
- **Course Outline**
- **Course Objectives**
- **Course Schedule**

Content Units ◇
- **Unit Objectives**
- **Topics to be covered**
- **Learning Activities**
- **Assessments**
- **Online course material**

**Phases
of the Method**

Specify learning
requirements

Specify interaction
requirements

Specify user
interface
requirements

Specify content
requirements

Specify operational
requirements

Verify
requirements

Design the web study guide structure

Define course description

Define authors information

Design content units

Define evaluation and study techniques

Define bibliography

Design web pages

Create course site

Build study guide prototype

Validate and verify design

- The method was tested by developing three web-based courses:
  - **A distance learning course in Software Engineering**
    - www.centauro.ing.ula.ve/isoo
  - **A campus-based course on Software Engineering**
    - www.csee.usf.edu/montilva/cen4020-002/cen4020.html
  - **A campus-based course on Software Design Methods**
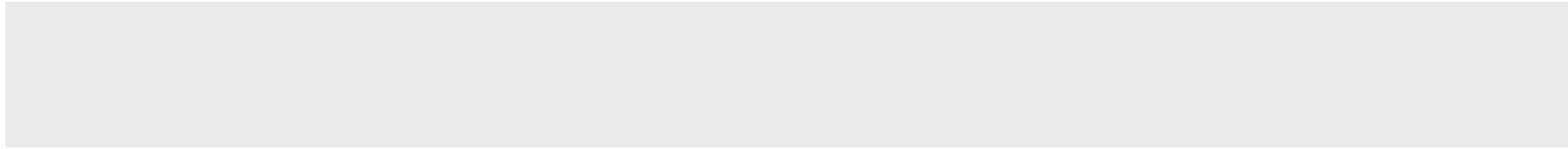   - www.csee.usf.edu/montilva/cis4930/cis4930.html

- The method provides a well-structured and detailed guide to develop web-based courses
  - **It helps the course developers to organize, plan and control the development process**
  - **It covers all the activities involved in the development process:**
    - analysis, specification, design, production and delivery of a web-based course.
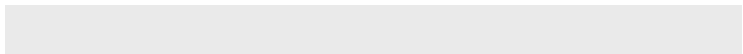- The method contributes significantly to increase the quality and effectiveness of web-based courses

Thanks for your attention

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