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# The Contribution of Scientific Evaluation

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International Conference on "Modeling and Measurement of Competencies in Higher Education"  
Berlin, 2011

**„True genius resides in the capacity  
for evaluation of uncertain, hazardous,  
and conflicting information.“**

**(Winston Churchill)**

# What is scientific evaluation (evaluation research)?

## Scientific Evaluation

analyses based on defined scientific standards

- **Effectiveness** (goal achievement) and
- **Efficiency** (relation between costs and benefits)

of programs, projects, activities etc. (Spiel, 2001; 2004).

Evaluation bears similarities to quality management (e.g., ISO 9000, TQM)

# What is program evaluation?

## „Program evaluation

is the systematic collection of information about the activities, characteristics, and outcomes of programs to make judgements about the program, improve program effectiveness, and/or inform decisions about future programming.“

(Patton, 1996, p.23)

- Program evaluation capitalizes on existing theory and empirical generalizations from the social sciences
- Program evaluation is applied research

## What are the central questions when conducting an evaluation?

- **What are the goals of the program?**
- **How these goals should be achieved?**
- **How program effectiveness (goal attainment) could be recognized?**
- **Are the resources needed available?**

Method: „Workshop on goal explication“

## What are the key concepts of evaluation?

- **Baseline data collection** to describe the current situation and to monitor and explain changes
- **Prospective evaluation** to determine the program's potential of realisation and the scope of its effects
- **Formative evaluation** to describe the progress of the program
- **Process evaluation** to check the extent to which planned activities are executed
- **Outcome evaluation** to prove whether the program achieves its goals
- **Summative (impact) evaluation** to prove the entire impact of a program

## What are the levels of evaluation?

### **1. reaction**

acceptance/ satisfaction (Happiness-Sheets)

## What are the levels of evaluation?

**1. reaction**

**2. learning**

knowledge, competencies, and attitudes



## What are the levels of evaluation?

**1. reaction**

**2. learning**

**3. behavior**

transfer to the „working place“

## What are the levels of evaluation?

**1. reaction**

**2. learning**

**3. behavior**

**4. results**

changes on system/ organizational level  
(ultimate evaluation)

## What are the levels of evaluation?

- 1. reaction**
- 2. learning**
- 3. behavior**
- 4. results**

(Kirkpatrick, 1994)

# What are the standards of evaluation?

## **An evaluation standard**

is a principle mutually agreed on by people engaged in the professional practice of evaluation, that, if met, will enhance the quality and fairness of an evaluation.

(Joint Committee on Standards of Evaluation, JCSEE, 1994)

# What are the standards of evaluation?

(JCSEE, 1994; DeGEval, 2002)

**Guidelines for effective evaluation: 30 standards**

**Utility standards**

**Feasibility standards**

**Propriety standards**

**Accuracy standards**

**Example:**

# **Evaluation of Curricula in Higher Education**

**Challenges and strategies using the sample case of Medical Education**

Spiel, Schober & Reimann (2006), Evaluation Review, 30, 430-450.

## What should be evaluated?

The evaluation of a curriculum investigating its effectiveness has to analyze concrete educational goals and their realization

- **Acquired competencies of the graduates are the central indicators for the quality of a curriculum**

# What should be evaluated?

## Procedure:

- **review of literature**
- **interviews with representatives of the stakeholder groups** (students, graduates, university teachers, clinical supervisors of graduates)
- **definition of areas of expertise**: factual knowledge in natural sciences, factual knowledge in social sciences, communication skills, skills required to perform routine medical jobs, socio-ethical values, coping skills, self-regulated information management
- **development of instruments** to measure these competencies



## **What is the frame of reference for the evaluation?**

In order to obtain information regarding teaching effectiveness, predominantly student ratings are used as parameters for good teaching.

If different views are taken into account, ratings differ substantially.

## What is the frame of reference for the evaluation?

### Procedure:

- **two bases of reference** are systematically considered: the learner's and the teacher's view
- **teachers** were asked to assess to what degree the learners actually possess the competencies (**external ratings**)
- **learners** were asked to assess to what extent they believe to possess them (**self-ratings**)

## What perspective should be evaluated?

Effective curriculum evaluation has to analyze

- (1) the **concrete educational objectives** and
- (2) their **realization**

→ two questions have to be posed:

- (1) What should be imparted?
- (2) What is really imparted?

## What perspective should be evaluated?

### Procedure:

- **teachers** (experts) are asked to evaluate to what degree the medical education should impart the seven relevant areas of expertise (**ideal**)
- **learners** are asked to evaluate to what extent the present educational program would impart these areas of expertise (**real**)

## Who are the participants of evaluation?

To obtain valid information about educational goals and their realization at least the learners' and teachers' views must be considered

It is very efficient to collect data from students and university teachers

→ to obtain information about a curriculum's effectiveness,  
**not only short time effects are relevant**

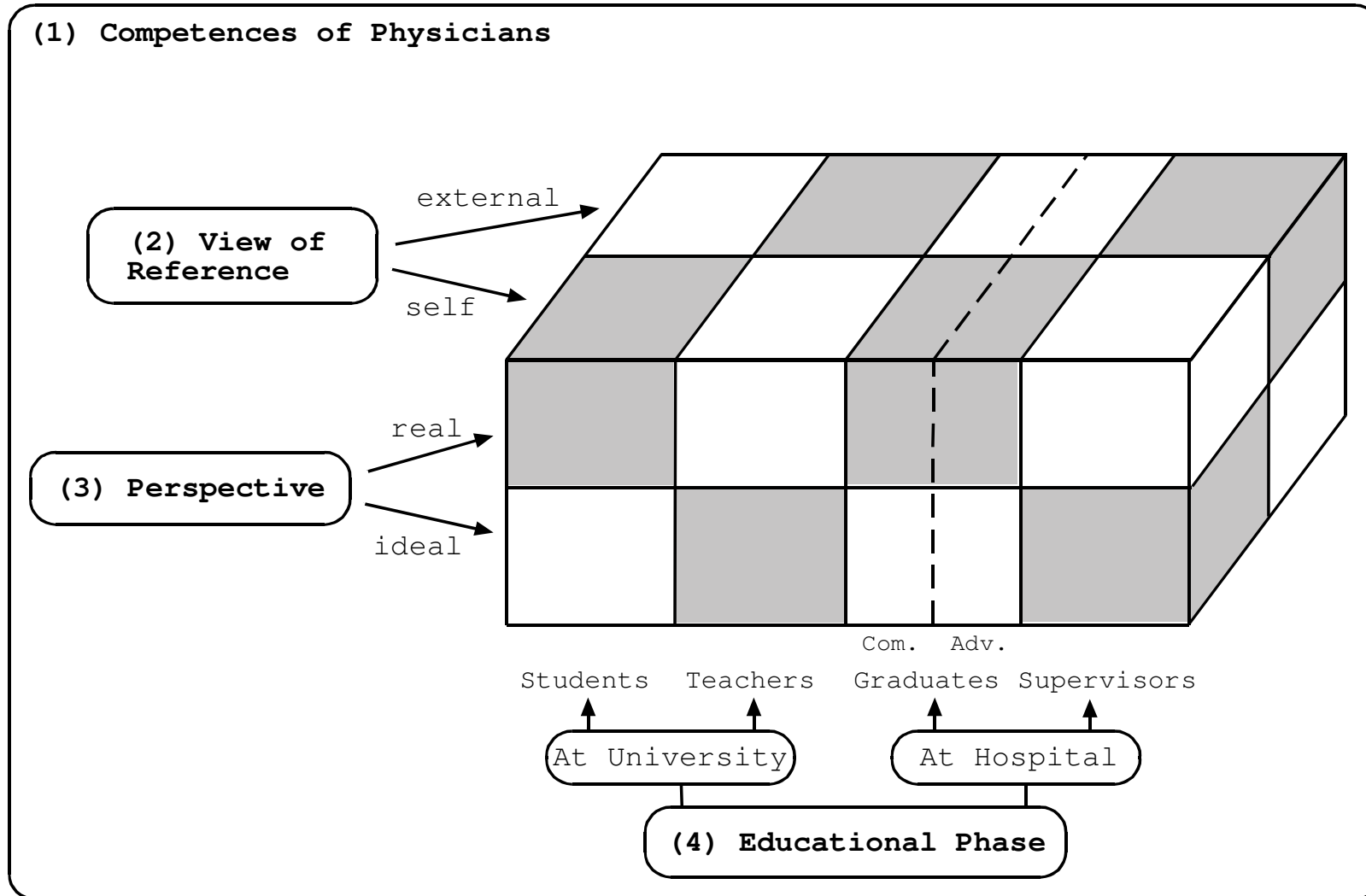
## Who are the participants of evaluation?

### Procedure:

4 subsamples are investigated:

- (1) **advanced students** in medical education at university
- (2) **graduates** who presently complete the obligatory full-time internship in various hospitals (commencing graduates and more advanced graduates to take the „practical shock“ into account)
- (3) **university teachers** of the students
- (4) **clinical supervisors** of the graduates

# Strategies applied

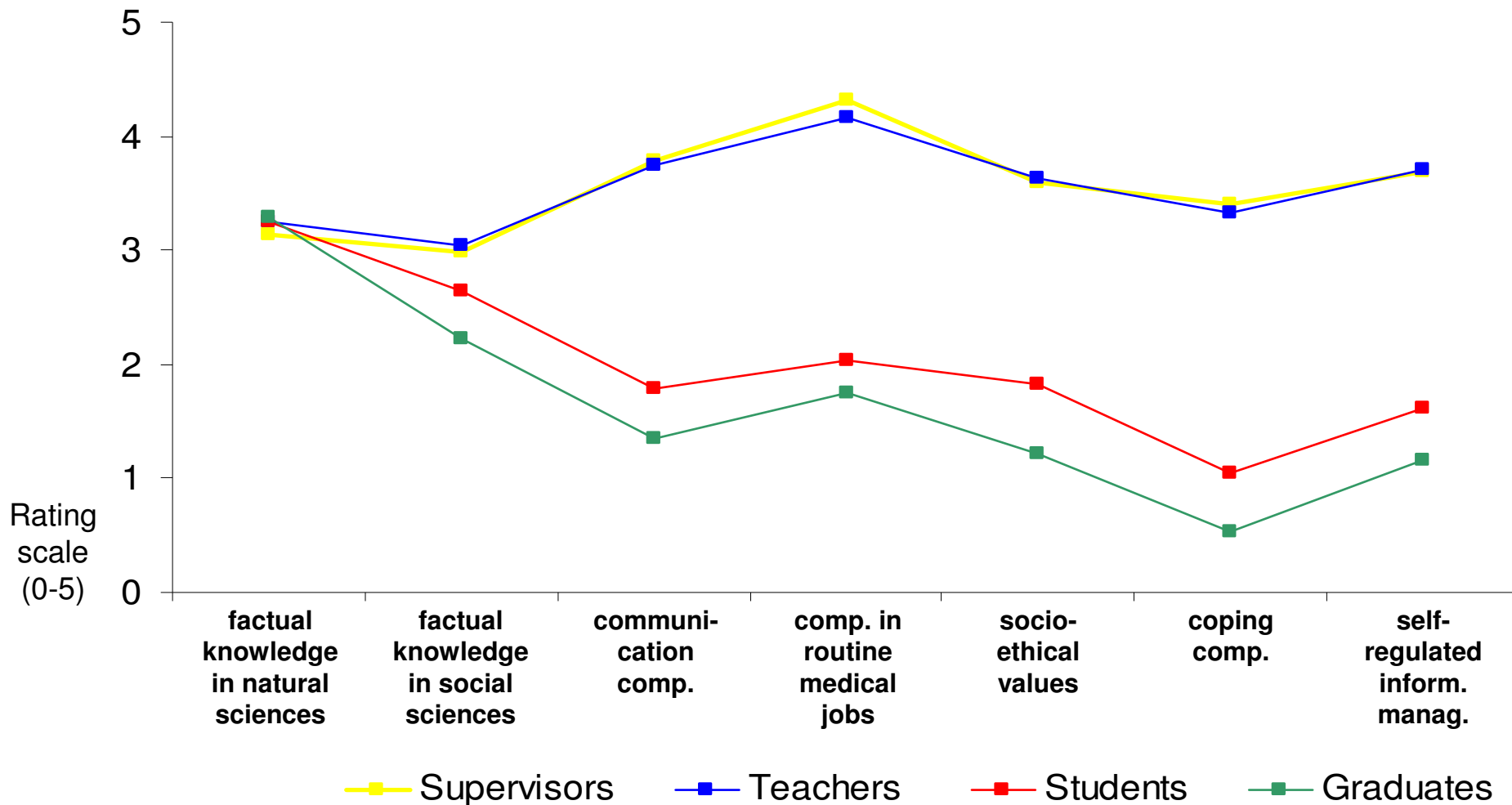


■ = Collected Data

Com. = commencing graduates; Adv. = advanced graduates

# Selected Results

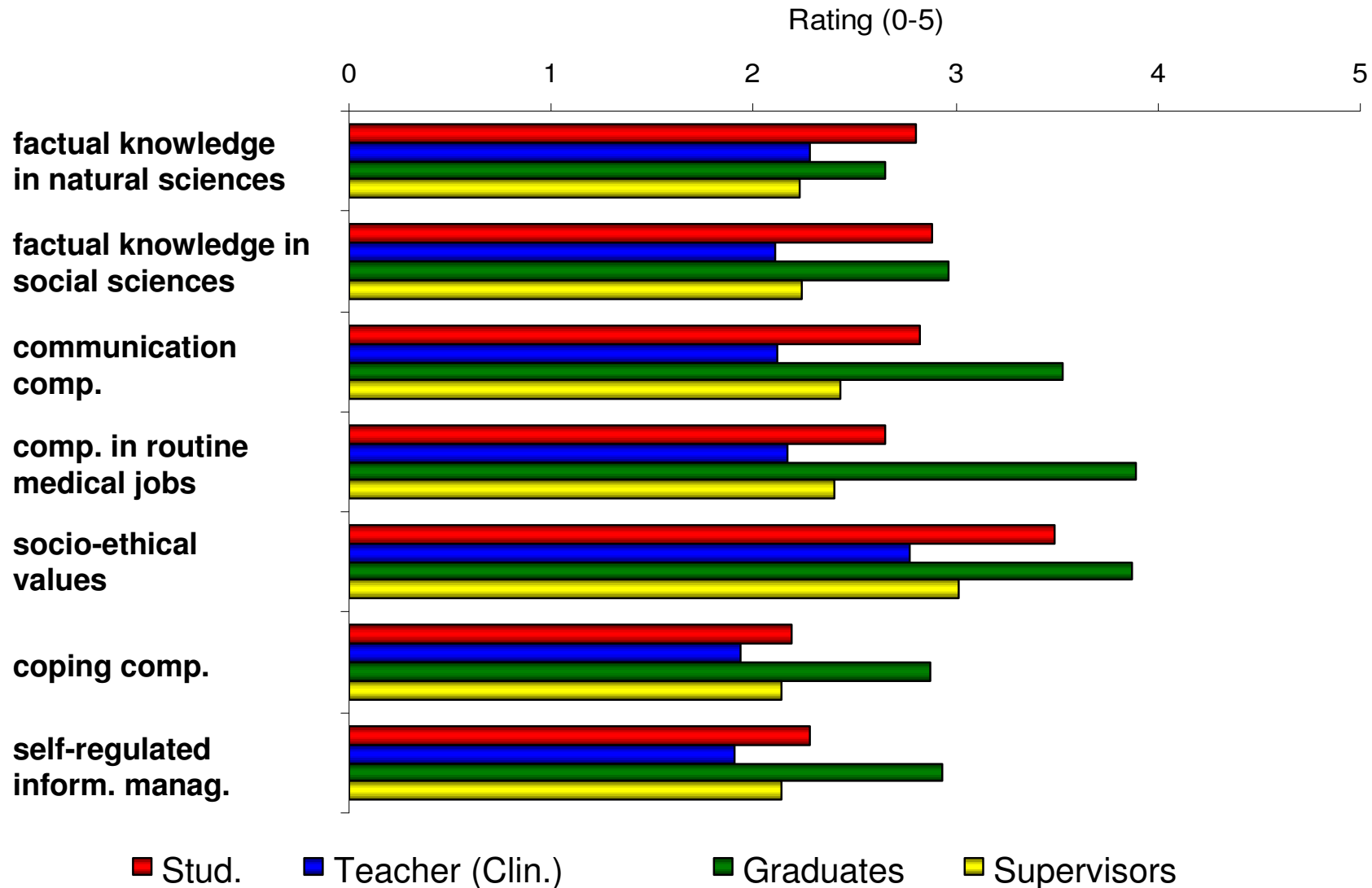
What are the competencies medical students should acquire at university (ideal) and to what degree are these competencies actually imparted (real)?





# Selected Results

To what degree students/graduates possess the competences?



**Messages take home**  
**for Modeling and Measurement of**  
**Competencies in Higher Education**

# What is the contribution of scientific evaluation?

**Competence profile of freshmen**



**Curriculum (= intervention)**



**Competence profile of graduates**

## What is the contribution of scientific evaluation?

- Take into account how the **curriculum contributes** to the development and promotion of competencies in students (ideal = goals of the curriculum, experts' perspective, real = quality of implementation, students' perspective)
- Consider the different **concepts of evaluation** (from baseline to impact evaluation) when developing and evaluating a curriculum
- Have in mind the four **levels of evaluation** → do not stop at the second level (learning)
- Take into account **competence profiles** (e.g., for freshmen or graduates) – single competencies are developed and promoted in relation (or dependency) to other competencies
- and ...

## Creating a Culture of Evaluation...

Eureka! An evaluation culture has finally been grown in the lab!

Now if only we could figure out how to grow it in the real world.

Hey look, these guys are forming a subcommittee! Wait, nope, they're disputing the results.



Rebecca Andrews  
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