

THE IDEAL ASSESSMENT TOOL: VALID AND SECURE E-ASSESSMENTS WITH MOODLE AND SAFE EXAM BROWSER

MOODLE MOOT, 2013.09.06

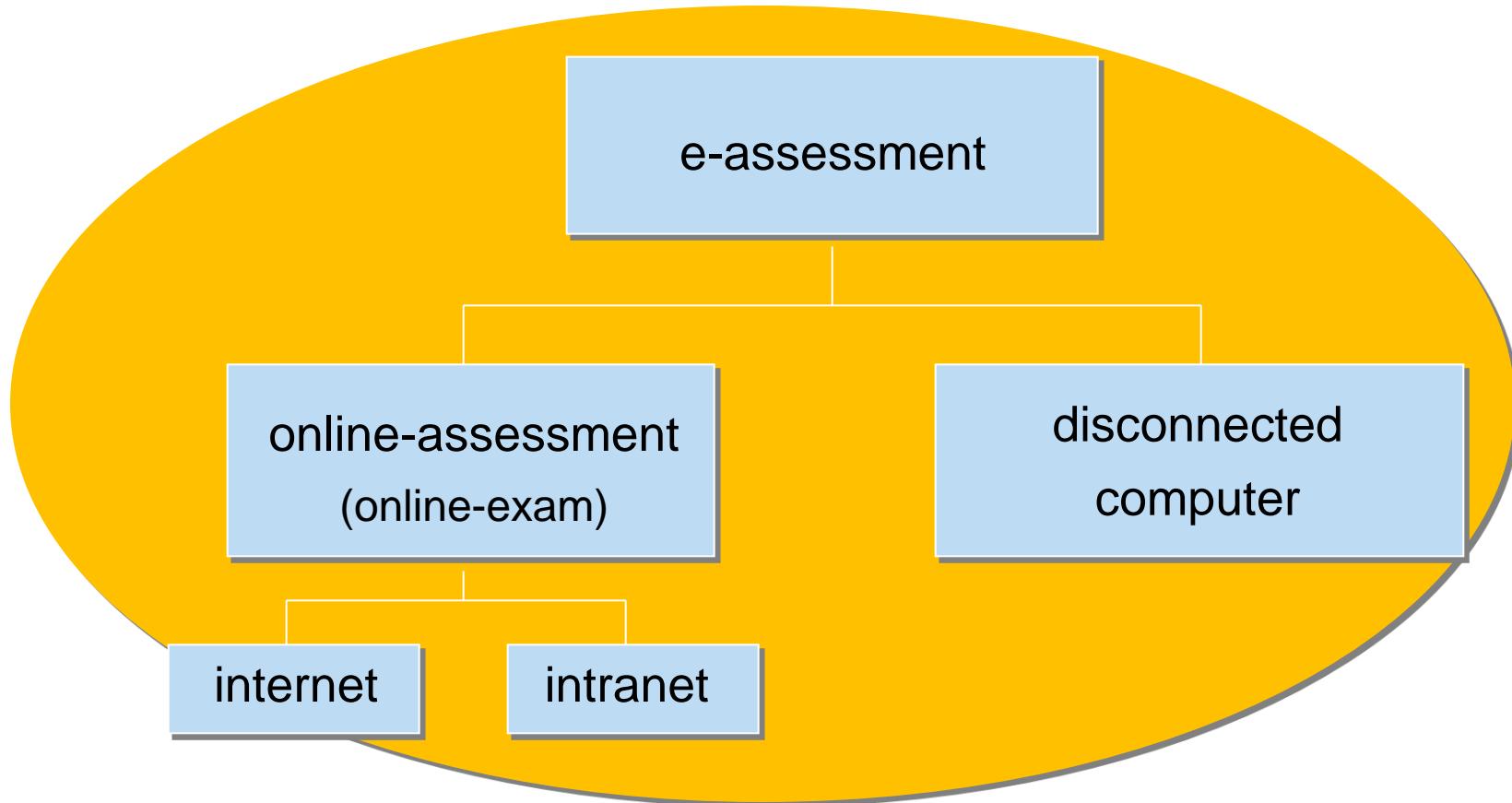
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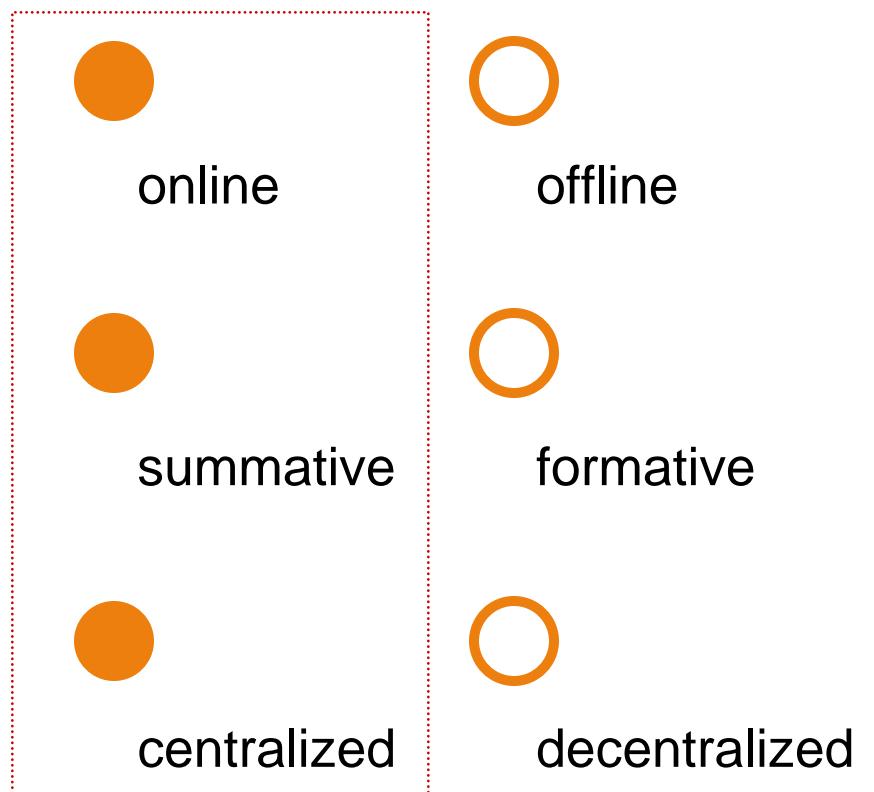
INTRODUCTION



Terminology



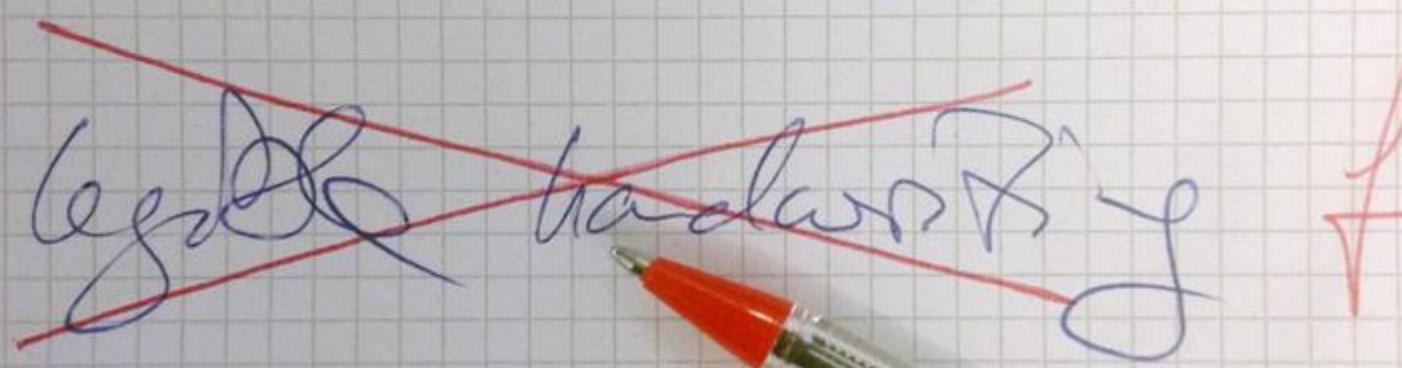
Online-Exams at ETH Zurich



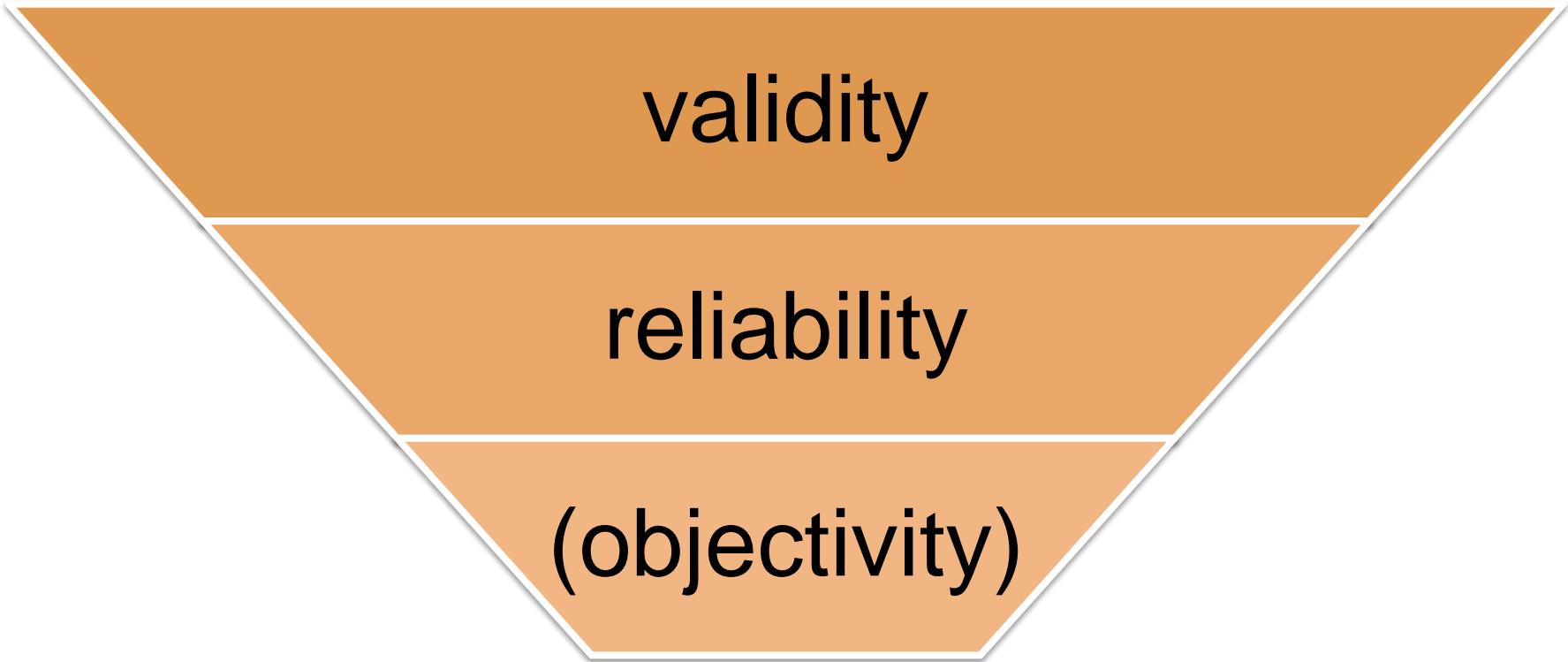
Why do Exams Matter?

- «Will this be on the exam?»
 - Exams strongly influence what and how students learn.
 - motivation / focus / direction / perception
- «Will I pass the exam?»
 - Exams strongly influence which students complete a curriculum.
 - skills / interests / strengths / weaknesses
- «What should I test in a exam?»
 - Exams subtly yet fundamentally influence the future direction of a discipline.

ADVANTAGES OF ONLINE-EXAMS



Criteria for Measurement Quality

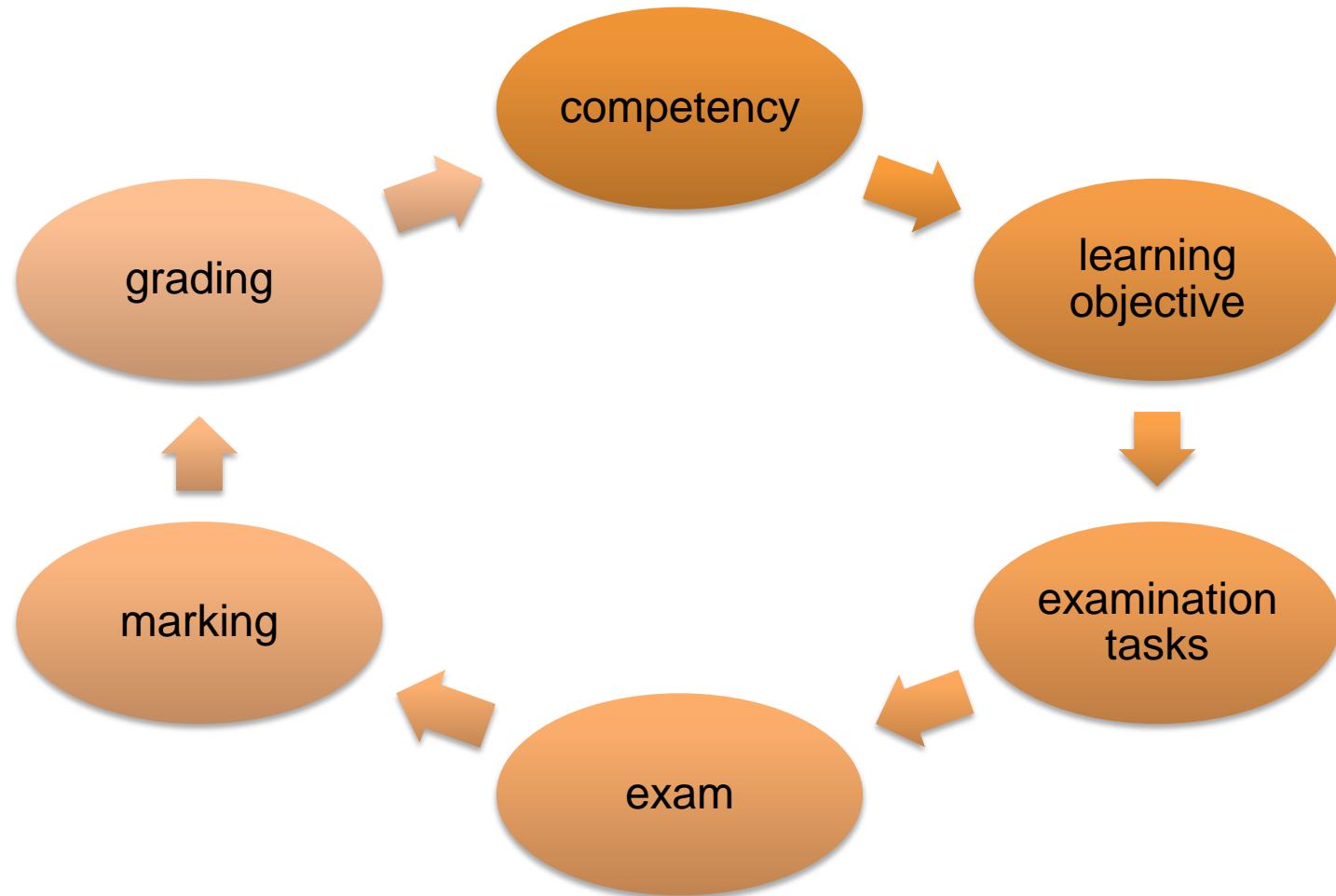


validity

reliability

(objectivity)

Examinations as Measurements



Classification of Question Types

closed

- SC
- MC
- matching
- ordering
- drag & drop

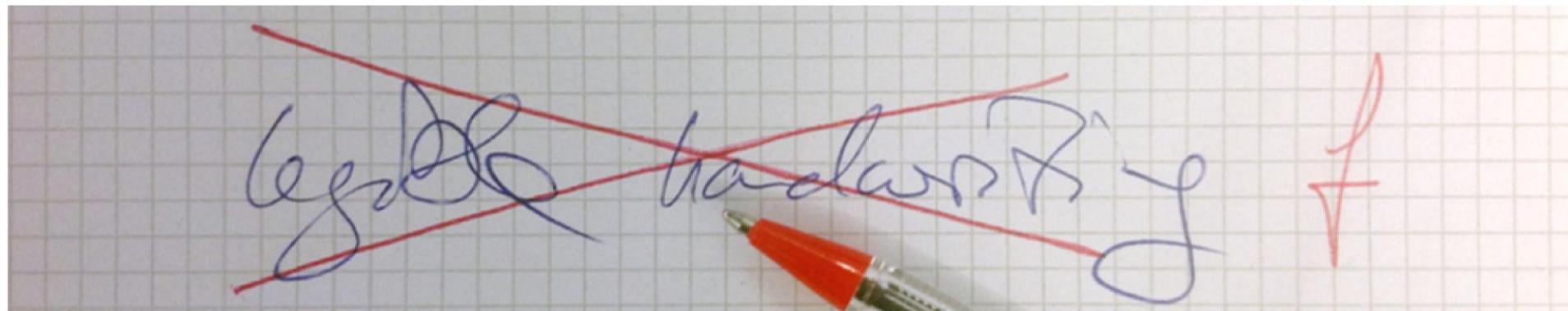
semi-closed

- short answer
- text
- numerical
- hotspot

open

- essay
- 3rd party SW
- sketch

Advantage: Legibility, Editing

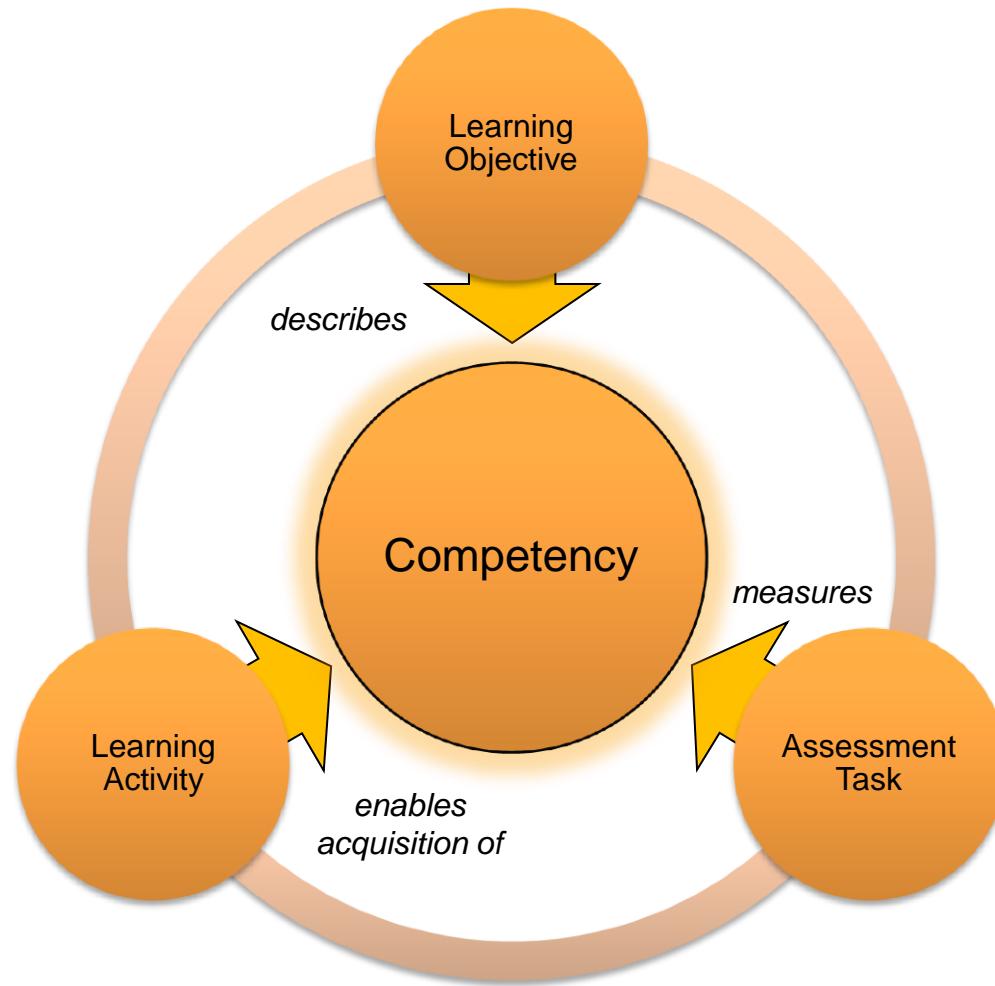


legible typewriting

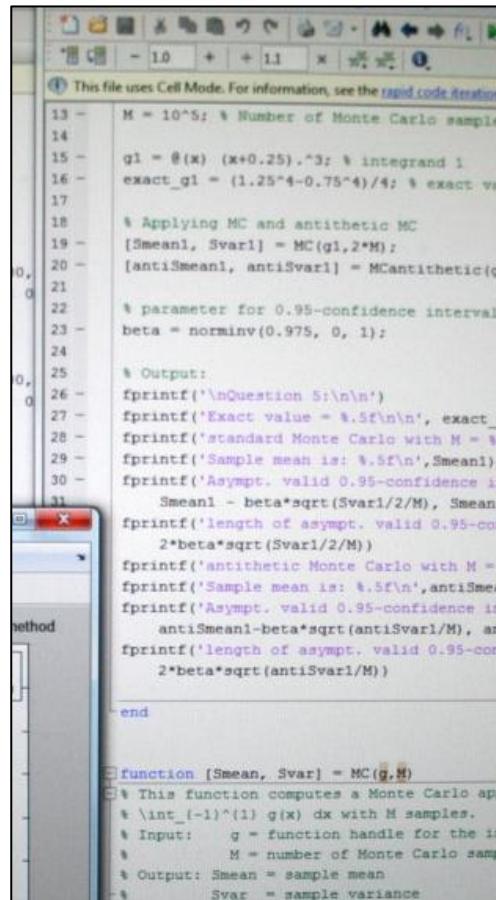
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Alignment



Advantage: Alignment

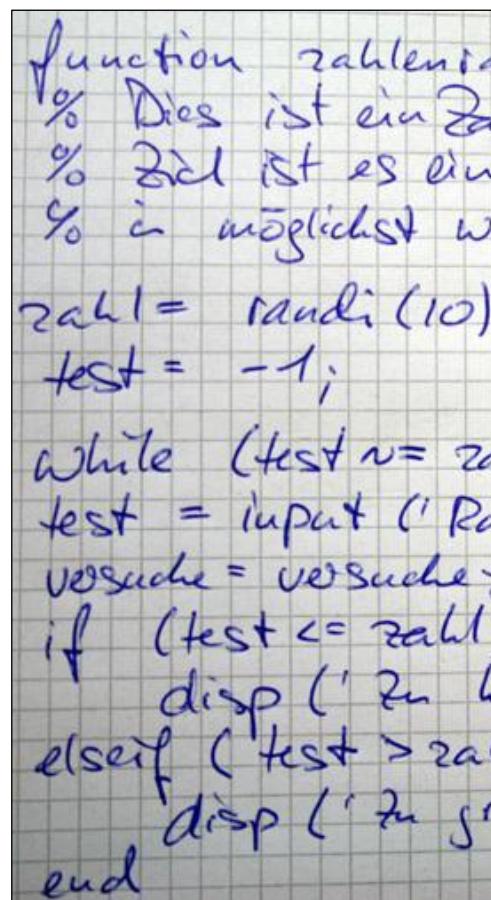


```

% This file uses Cell Mode. For information, see the rapid code iteration
13 - M = 10^5; % Number of Monte Carlo samples
14 -
15 - g1 = @(x) (x+0.25).^3; % integrand 1
16 - exact_g1 = (1.25^4-0.75^4)/4; % exact value
17 -
18 - % Applying MC and antithetic MC
19 - [Smean1, Svar1] = MC(g1, M);
20 - [antiSmean1, antiSvar1] = MCantithetic(g1,
21 -
22 - % parameter for 0.95-confidence interval
23 - beta = norminv(0.975, 0, 1);
24 -
25 - % Output:
26 - fprintf('\nQuestion 5:\n\n')
27 - fprintf('Exact value = %.5f\n', exact_g1)
28 - fprintf('standard Monte Carlo with M = %d:\n', M)
29 - fprintf('Sample mean is: %.5f\n', Smean1)
30 - fprintf('Asympt. valid 0.95-confidence interval: %.5f\n', ...
31 -     Smean1 - beta*sqrt(Svar1/2/M), Smean1 + beta*sqrt(Svar1/2/M))
32 -
33 - function [Smean, Svar] = MC(g, M)
34 - % This function computes a Monte Carlo approximation to \int_{-1}^1 g(x) dx with M samples.
35 - % Input: g = function handle for the integrand g
36 - %        M = number of Monte Carlo samples
37 - % Output: Smean = sample mean
38 - %          Svar = sample variance
39 - end

```

learning activity

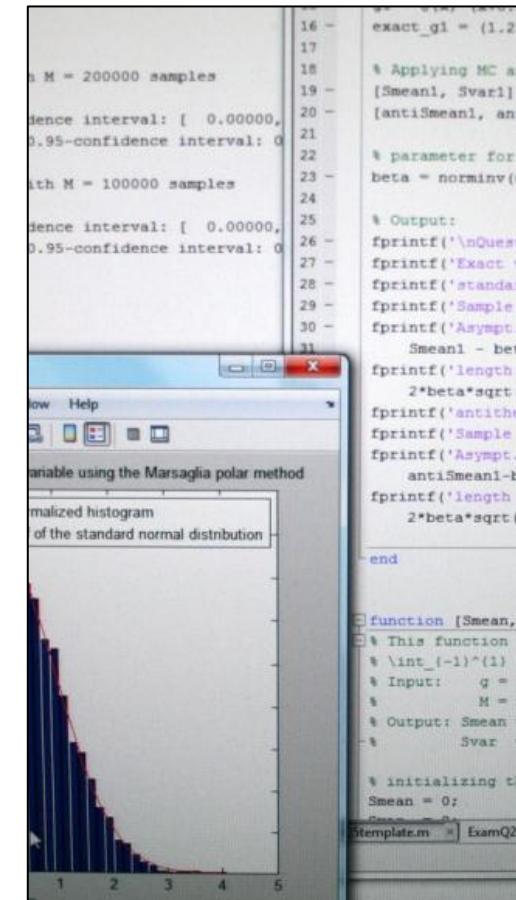


```

function zahlenia
% Dies ist eine Zahl
% Zahl ist es eine Zahl
% in möglichst viele
zah1 = randi(10)
test = -1;
while (test ~= zah1)
  test = input('Ra
versuche = versuche + 1;
if (test <= zah1)
  disp ('Zu
elseif (test > zah1)
  disp ('Zu gro
end

```

assessment task



target competency

Online-Exams: Advantages



Quality

- legibility
- editing
- SW-based competencies
- multimedia
- interactivity
- feedback
- quality control



Efficiency

- marking
 - automatic
 - manual
- administration
- processes
- collaboration
- question pools

INFRASTRUCTURE FOR ONLINE-EXAMS



Questions to ask in the beginning

- What kind of examinations?
 - > Computer-based exams
 - > Online examinations
 - > Centralized exams
- Which infrastructure to use for your examinations?
 - > Special assessment computer rooms?
 - > Computer lecture rooms?
 - > Student computers?
- How can you prevent manipulation, fraud, plagiarism and the obtaining of information from the Internet?

One possible answer:

SEB
Safe
Exam
Browser



What is the Safe Exam Browser – SEB?

- Secured web browser application
- for conducting online examinations
- using learning management systems and web-based quiz/e-assessment systems
- available for free, open source

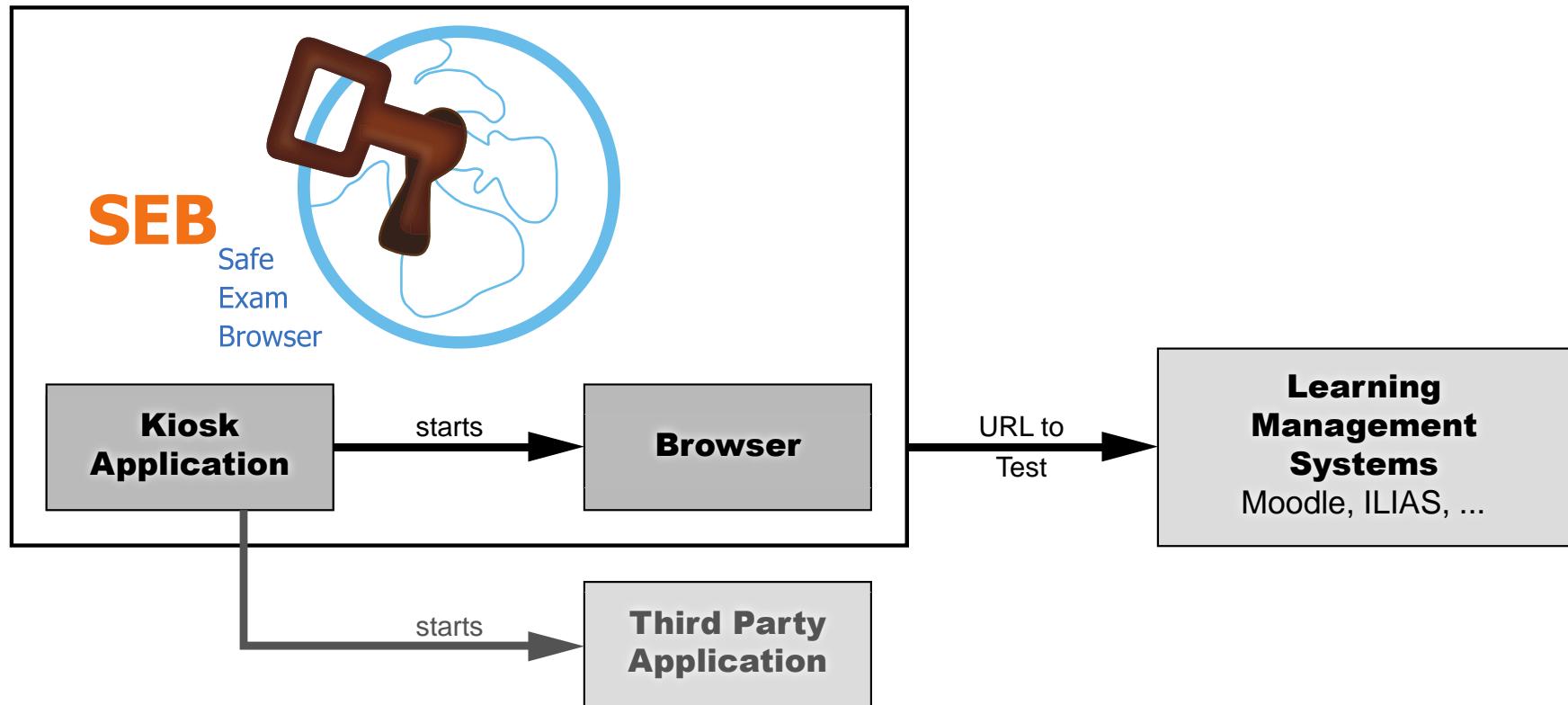
What is Safe Exam Browser – SEB doing?

- SEB prevents
- opening any website
- switching to undesired applications
- operation system specific key combinations and functions
- quitting the secure browser during the exam

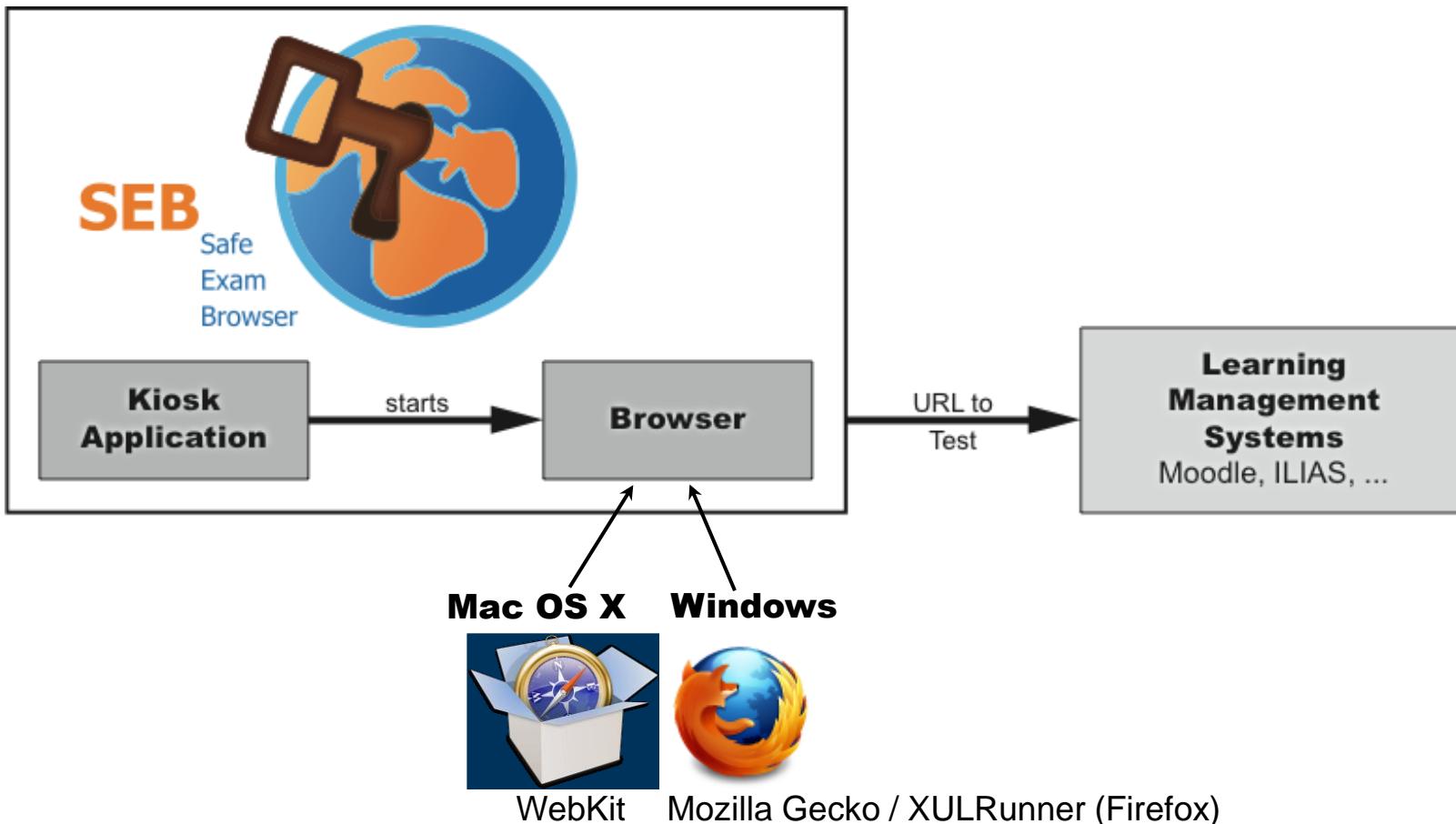
What is Safe Exam Browser – SEB doing?

- SEB allows
- connecting to web based learning management systems and web-based quiz/e-assessment systems
- use of selected third party applications during the examination

Architecture



The SEB-Browser



SEB 's advantages

- Application!



SEB 's advantages: Application

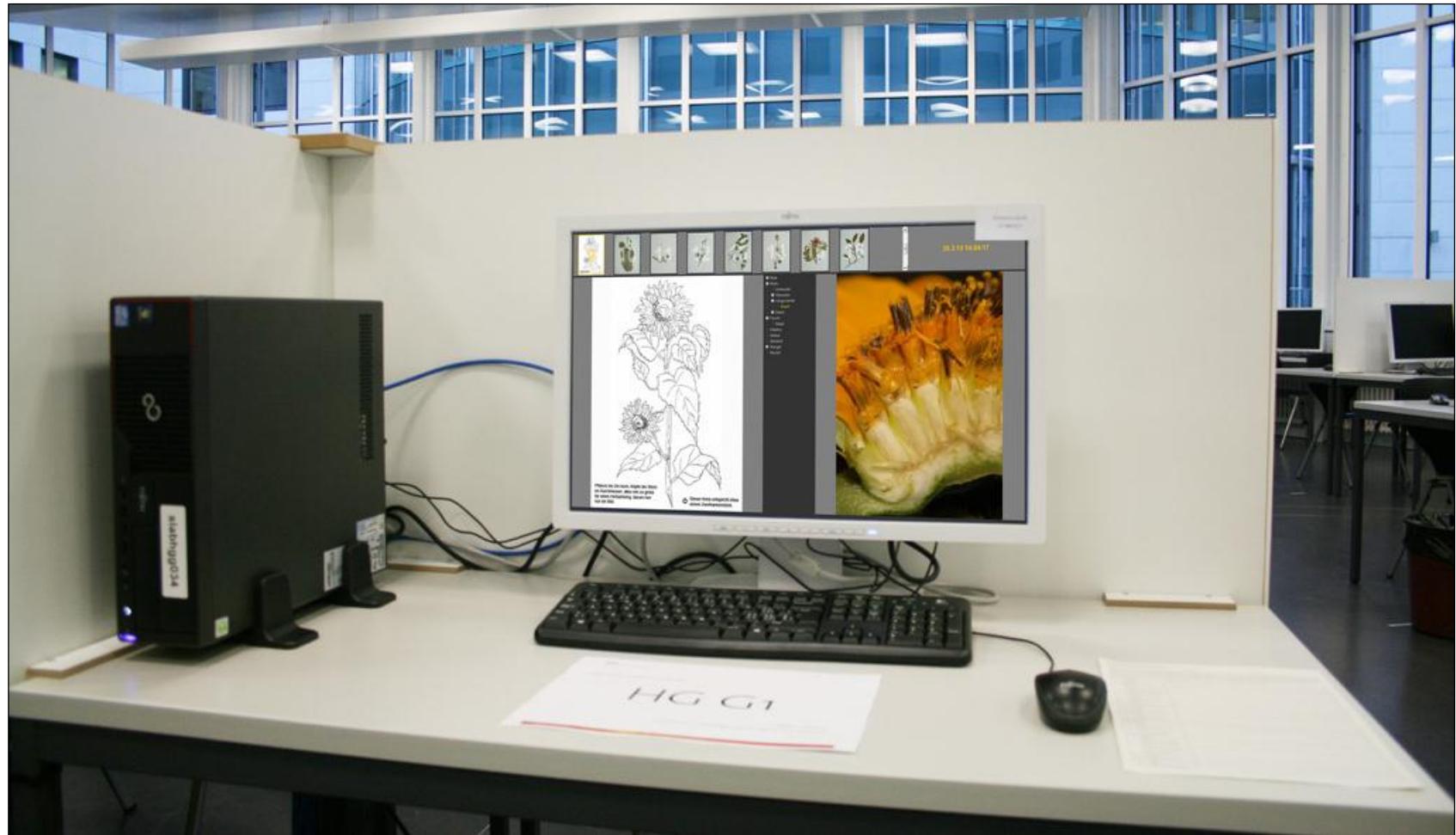


- Easy to install
- No complex administration of exam computers necessary
- No special network configuration necessary in the exam room
-

SEB 's advantages: Application vs. booting special OS

- Don 't have to create, test and regularly update special boot images
- Very good compatibility with a wide range of hardware
- Windows and Mac OS X **third party applications** can be used in parallel with the exam

Workstations



SUMMARY



When do Online-Exams provide benefits?

- essay type
- MC & short-answer
- SW based competencies
- multimedia
- multiple examiners
- large groups of candidates
- interactivity
- open book
- time-critical

Q&A

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ONLINE-EXAMS: ORGANIZATIONAL AND TECHNOLOGICAL CHALLENGES IN TRANSITIONING FROM PAPER TO ONLINE

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Online-Exams: Where Challenges & Opportunities

Challenges

- Stakeholders
- Infrastructure
- Processes

Opportunities

- Improved quality
- Improved efficiency
- Increased design possibilities

Question Types: Costs & Benefits

	quality	efficiency	IT-resources
MC	=	↑↑	💻
short answer	=	↑↑	💻
interactive/MM	★	(★)	💻 💻
essay	↑	↑	💻
3rd party SW	★ ★	(★ ★)	💻 💻 💻
sketch	-	-	-
formula	-	-	-

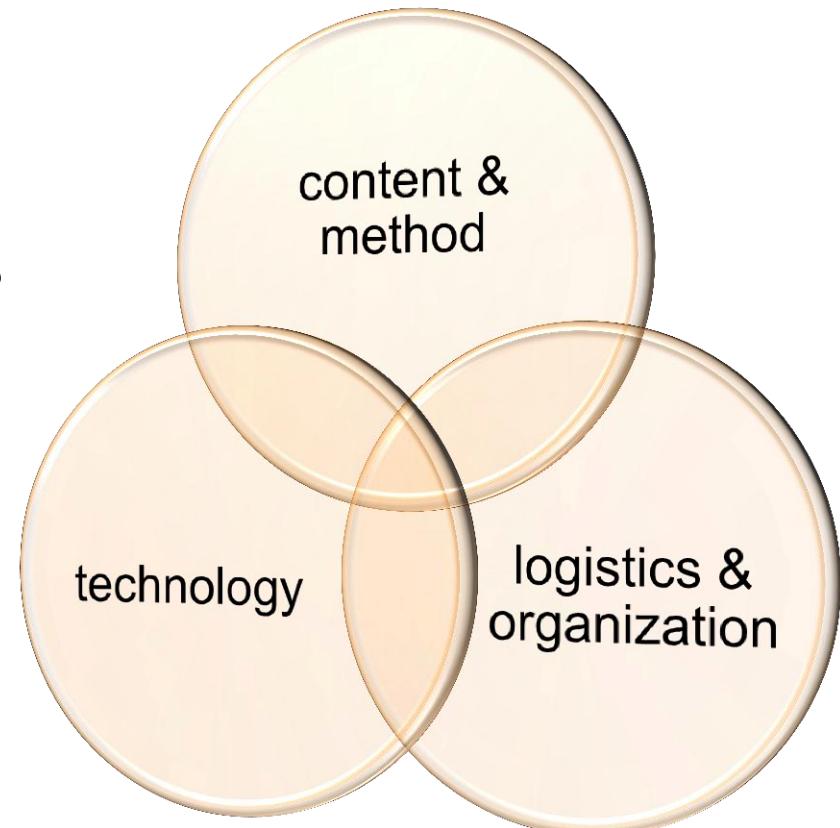
Exam-Scenarios

		design	delivery	tech-support	IT-resources
browser based one-to-one		⌚	⌚	⌚	💻
browser based open → closed		⌚⌚⌚	⌚	⌚	💻
browser based multimedia		⌚⌚	⌚	⌚⌚	💻💻
online & paper		⌚	⌚⌚	⌚	💻
3rd party SW		⌚⌚	⌚⌚	⌚⌚	💻💻💻
CAD		⌚⌚	⌚⌚	⌚⌚	💻💻💻💻
tablet		?	?	?	?

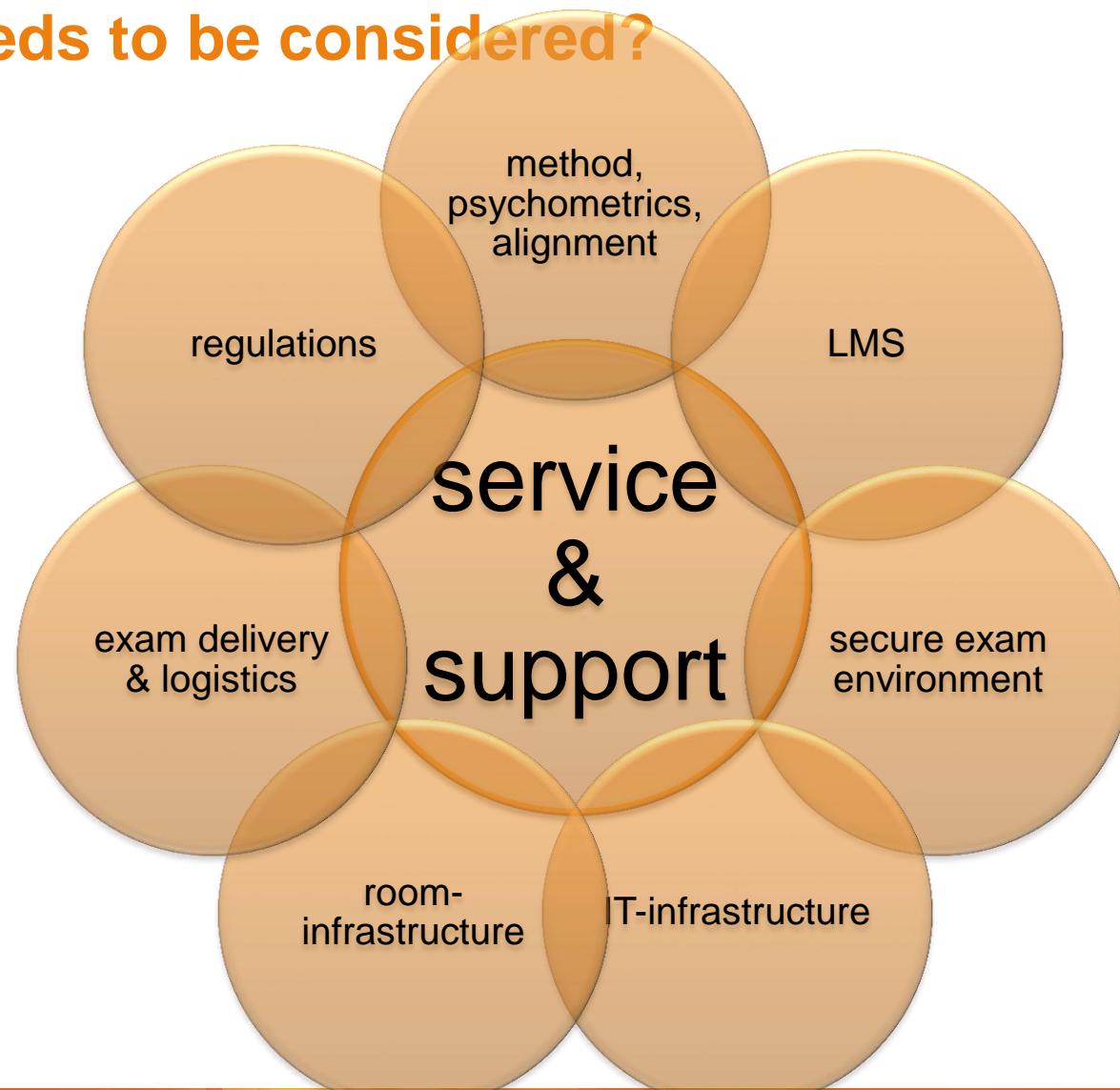
Designing Exams: What to consider

- **WHO** do I wish to assess?
- **WHAT** do I wish to assess?
- **HOW** do I wish to assess?

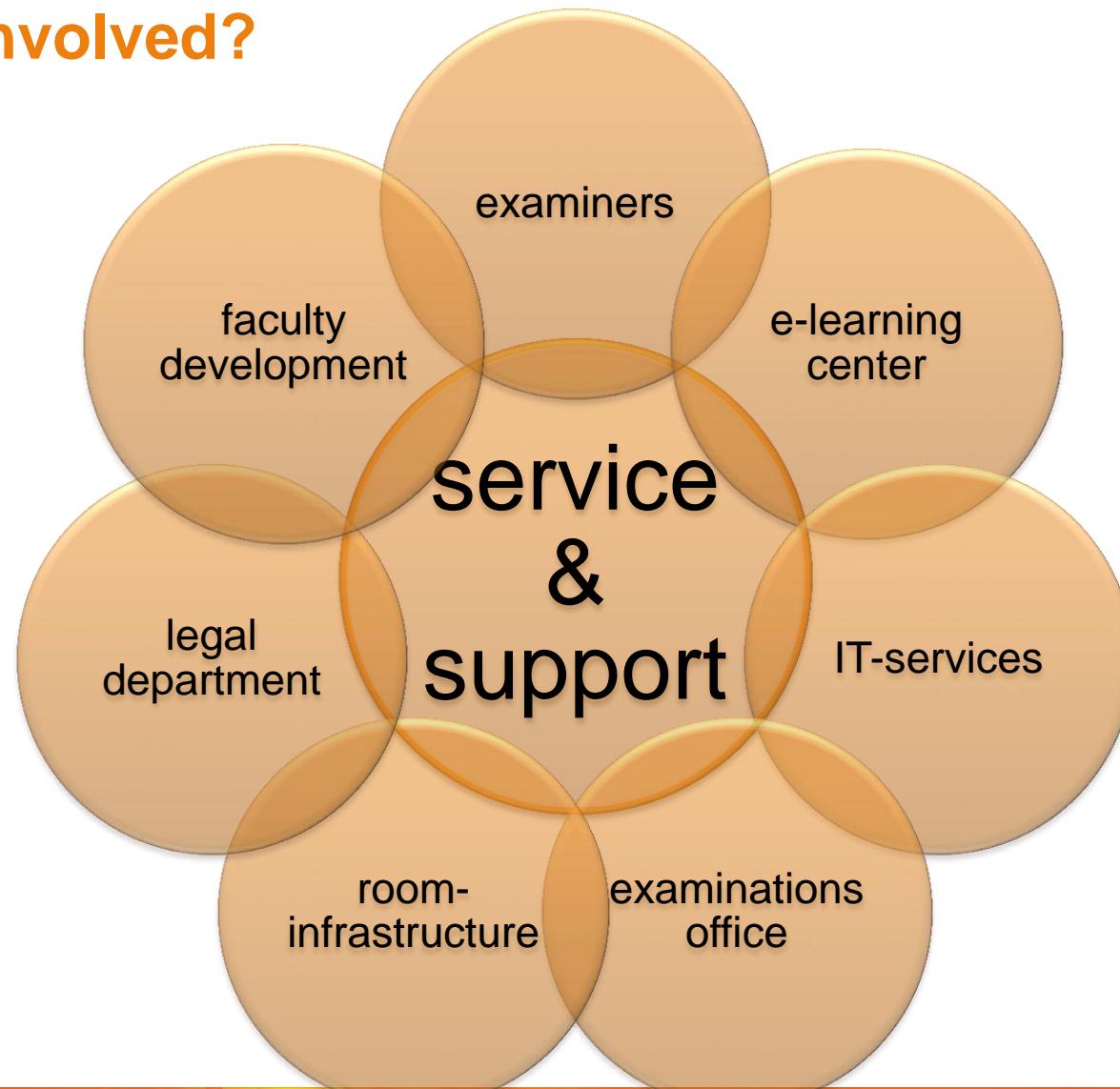
→ SCENARIO



Service & Support for Online-Exams: What needs to be considered?



Service and Support for Online-Exams: Who is involved?



Q&A

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