



Ontwikkeling van simulation- based serious games ten behoeve van logistieke besluitvorming

Durk-Jouke van der Zee

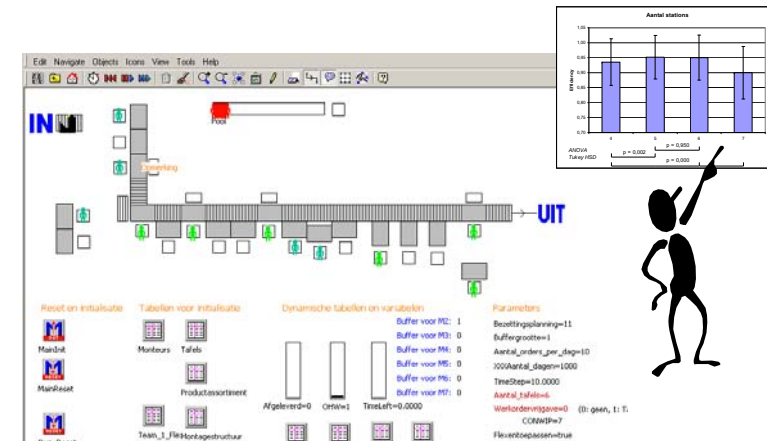
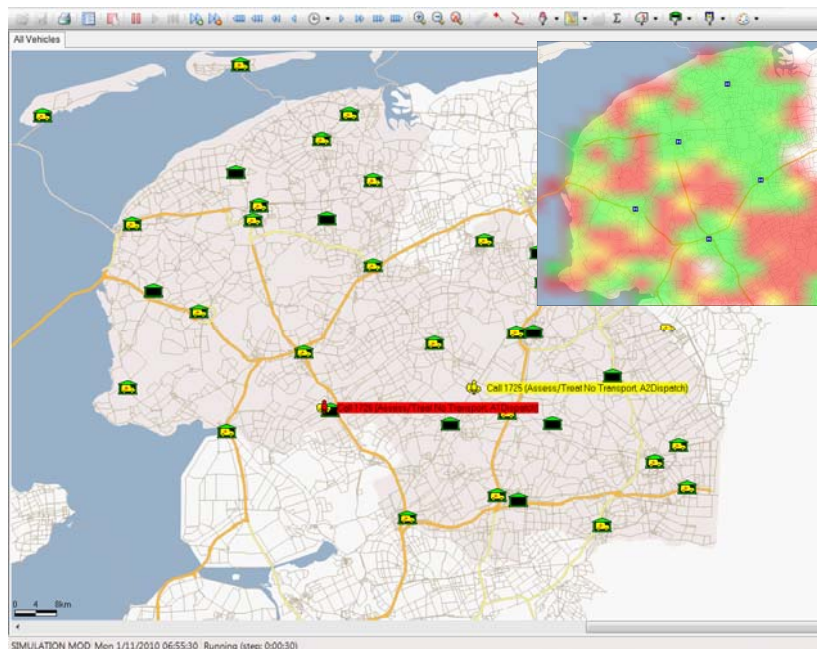
COPE Congres 2016

Track

Serious gaming in operations management en logistiek – Games als assets

Achtergrond

- › Universitair hoofddocent
- › Onderzoek: ontwerp en gebruik van computersimulatiemodellen ter ondersteuning van logistieke besluitvorming.



- › Onderwijs: games ten behoeve van logistieke practica

Aanleiding - voorbeeld

- › Nieuwe MSc cursus: health care operations
- › Cultiveren decision making skills
- › Learning by doing

Eerste gedachten:

- › Serious gaming i.p.v. bedrijfsbezoeken, projecten
- › Gebruik van simulatiemodellen?
- › MSc student beschikbaar (afstudeerproject)
- › Ervaring met gebruik simulatiemodellen...

Echter: Hoe aan te pakken? Weinig voorbeelden...

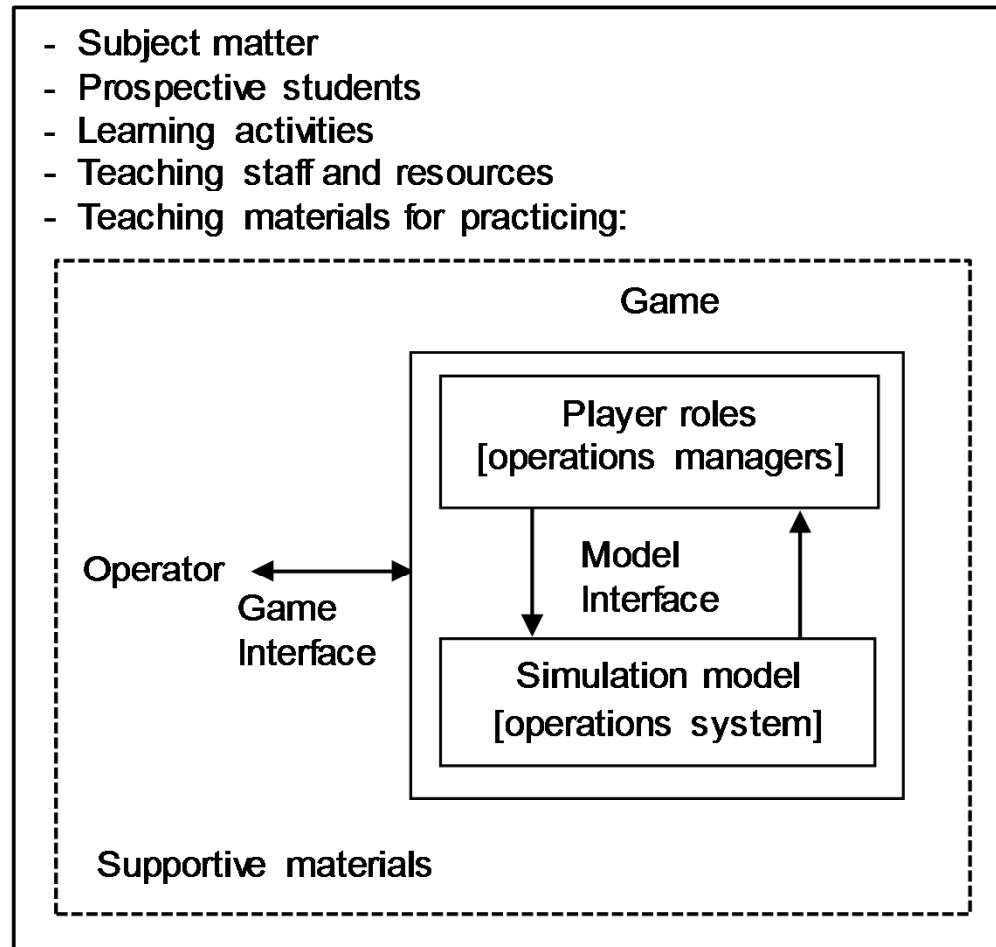


Naar een methodische aanpak...

> Waarheen:

Learning environment

- Subject matter
- Prospective students
- Learning activities
- Teaching staff and resources
- Teaching materials for practicing:



Hoe?

- › Interdisciplinair vraagstuk
 - Onderwijs
 - Gaming
 - Simulatie
 - ...

- › Echter: wetenschap, ontwerpers sterk disciplinair georiënteerd.



Oplossing: integratie van 3 ontwerpbenaderingen

Ontwerp van onderwijsmateriaal (Laurillard 2002)

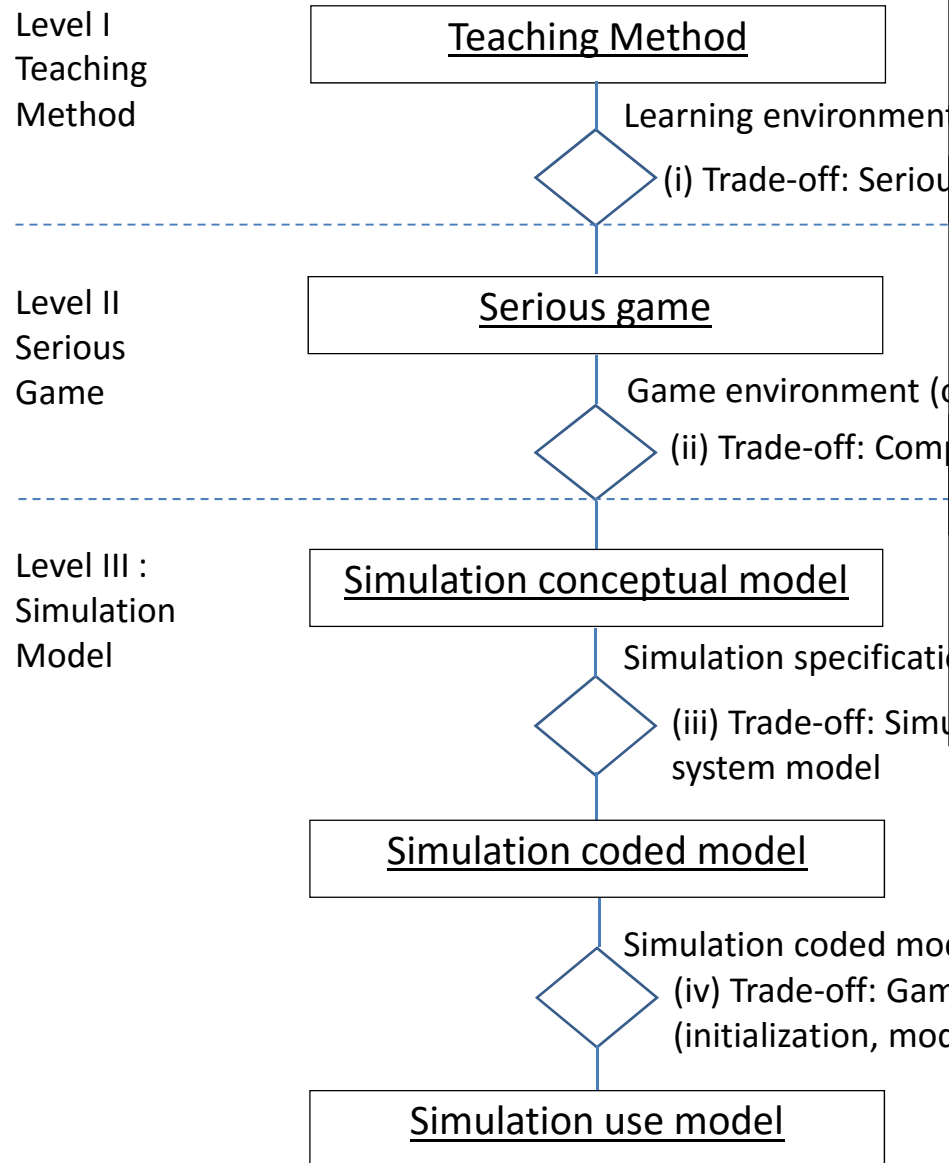


Ontwerp van een serious game (Greenblat 1988)



Ontwerp van een simulatiemodel ten behoeve van gaming
(Van der Zee et al. 2012)

[Van der Zee & Sloot 2014]



Teaching method

- Analyse student's learning needs
- Define learning objectives
- Design specific learning activities
- Test with pairs of students
- Design/refine media prototypes

Serious game

- Setting game objectives and parameters
- Model development
- Decisions on case representation

Simulation conceptual model

- Understanding the learning environment
- Determine modelling/general objectives
- Identify model outputs
- Identify model inputs
- Determine model contents

+ Guidelines, good practices, methods, tools specified for each step.

MSc cursus: health care operations

- > ED GAME

- > Students need to learn:
 - On the workings of a typical health care system (inputs, processes and outputs) and the influence of variability on system performance.
 - How logistics decision-making may influence system performance.
 - How quantitative models may support health care decision making.

- > Emergency department (ED) is chosen as an operations system
- > Students play the role of the manager of the ED, who has to consider several possibilities for improving ED logistical performance (e.g. more rooms, fast tracks, staff training etc.).



Settings

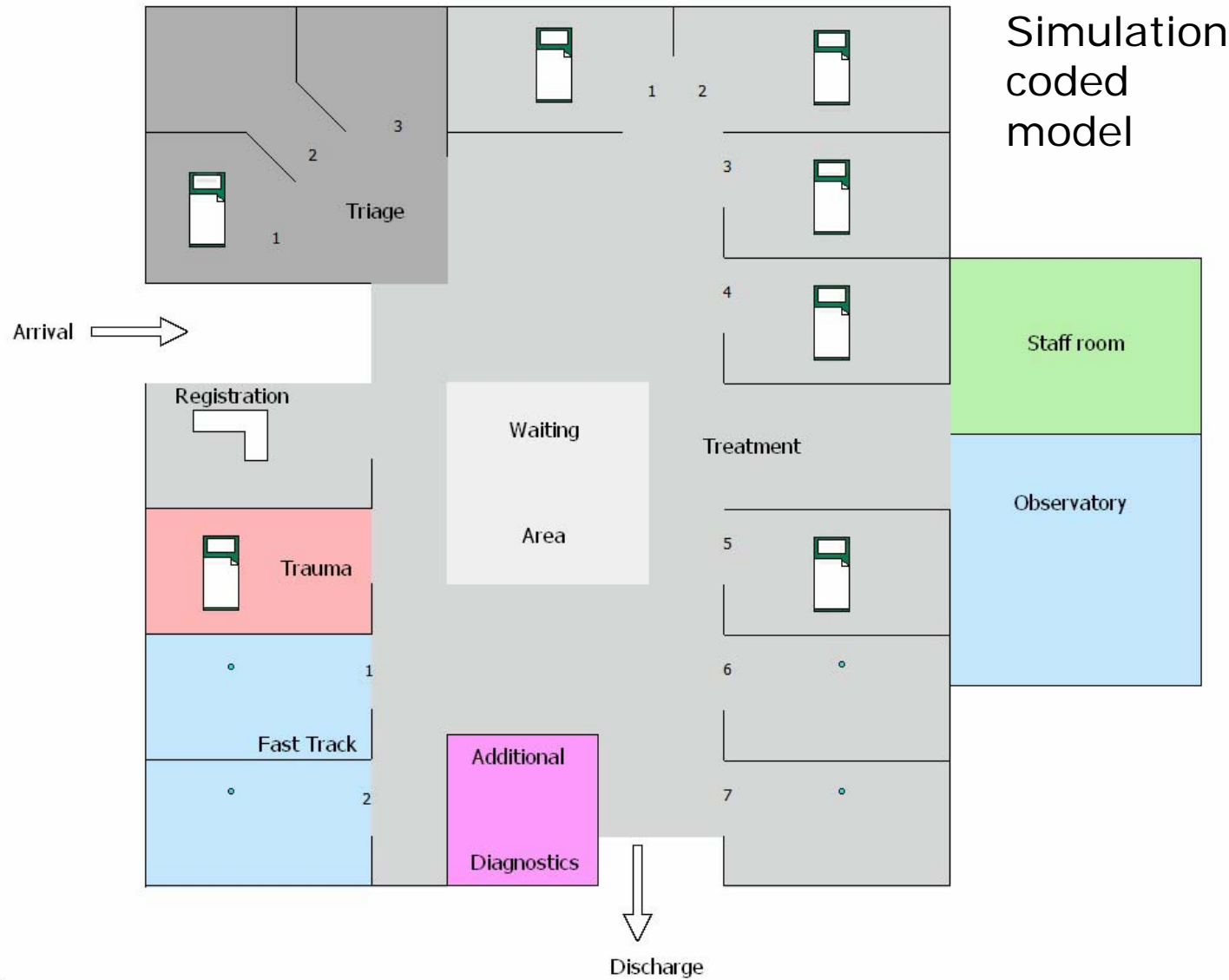
Rooms:
 5 Treatment rooms
 Reservation of treatment rooms during diagnostics

Patient arrivals:
 40 Patients arriving per day
 Daily pattern
 Equal patient urgency mix
 Spread service times

Solutions:
 Fast Track for triage level 5
 Observatory for treatment times > 3 h
 Shifts

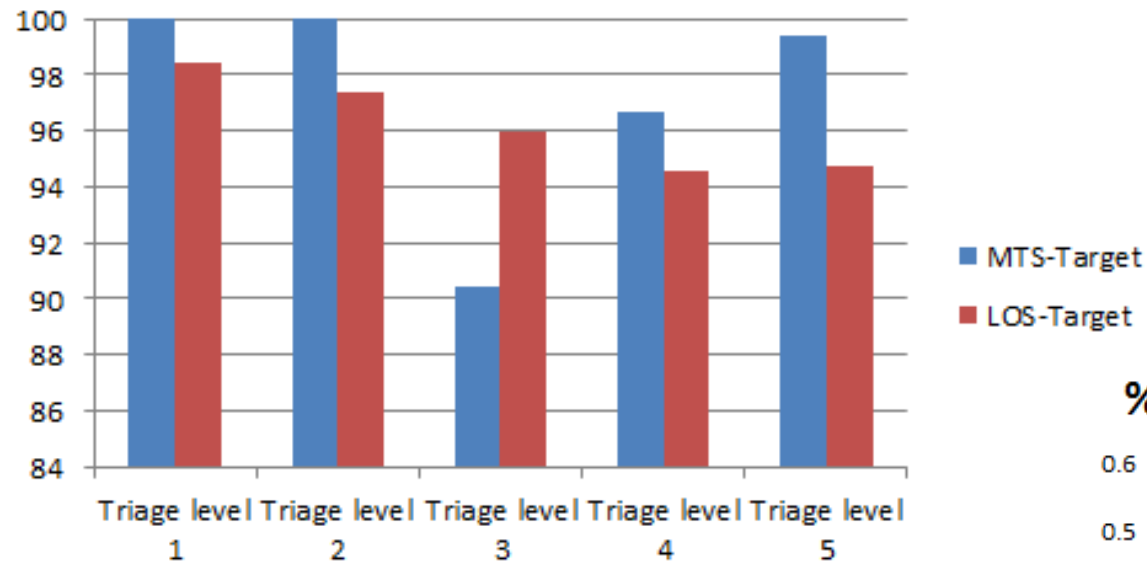
Targets:
 4 h LOS target

Screencast-O-Matic.com



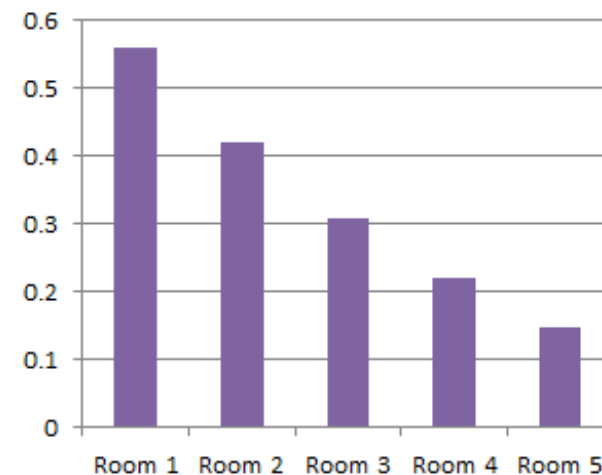
Reporting

% of target met

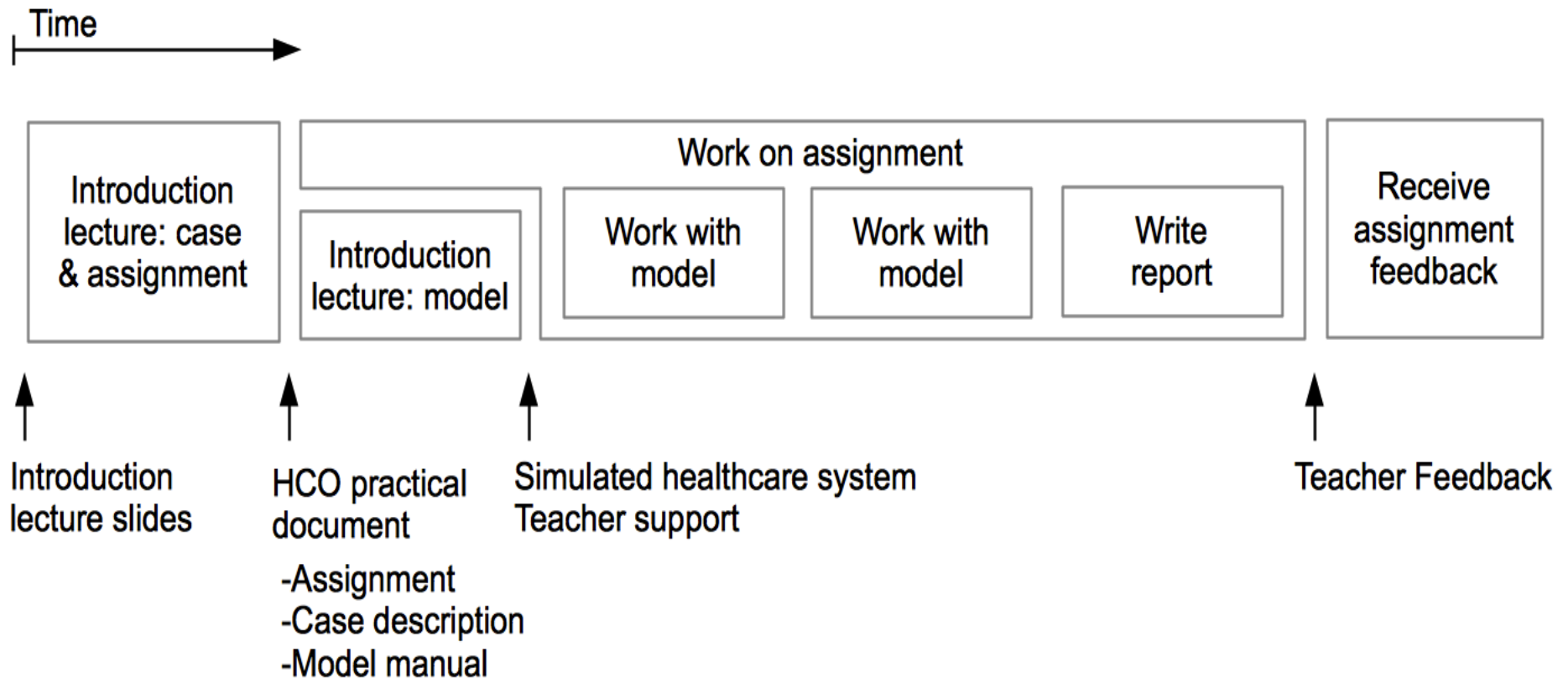


Patients served in time...

% utilisation of treatment room



Opzet game



Ontwerp serious game

- > Waarom?
 - Toesnijden case op cursus
 - Spelers kunnen groot aantal scenario's testen in korte periode
 - Patient veiligheid / privacy gewaarborgd
 - # Studenten te groot
- > Hoe?
 - Vaststellen leeractiviteiten (onderwijs), definiëren case (gaming), modelleren case (simulatie)
 - Logistiek systeem (spoed opvang)
 - Scenario's
 - Leer activiteiten -> rol manager -> modelleren rollen -> implementeren rollen
 - Validatie: student panel, en 3 managers spoedopvang betrokken

Discussie: voordelen aanpak

- > Verbeteren logistieke besluitvorming
Systematische aanpak -> effectiviteit leerproces
- > Gids voor game ontwikkelaars
- > Overzicht voor project managers (what to do, teamformatie)
- > Promotie van gebruik/ontwikkeling games
- > ...



Wrap up

- › Ontwerpmethoden voor serious games??
- › Interdisciplinaire aanpak noodzakelijk (methodology, teams)
- › Methode voor ontwerp simulation based serious games
- › Voordelen aanpak: betere besluitvorming, gids, slechten van barrières voor ontwikkeling en gebruik serious games



WRAP-UP



References

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- › Van der Zee, D.J., Holkenborg, J.B.M., and S. Robinson. 2012. Conceptual Modelling for Simulation-Based Serious Gaming. *Decision Support Systems* 54(1): 33-45.
- › Van der Zee, D.J., and J. Slomp. 2009. Simulation as tool for gaming and training in operations management – a case study. *Journal of Simulation* 3(1): 17-28.
- › Van der Zee, D.J., and S. Sloot. 2014. A framework for developing simulation-based serious games for operations management education. In *Proceedings of the Operational Research Society Simulation Workshop 2014*. Birmingham: OR Society.