Challenge-Based Learning (CBL) in the subject Smart City Design

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INTRODUCTION

- **Subject Smart City Design**

- **Opportunities for CBL**

- **Case study**

SUBJECT SMART CITY DESIGN

- **Introduction to Smart Cities**

- **Design and methods for smart city components**

- **Tools for smart city design**

- **Individual projects**

- **Lectures + Training course**

OPPORTUNITIES FOR CBL

- **Training course (2 hours weekly)**

- **Smart cities provide a wide range of challenges**

- **Project-oriented studies**

CHALLENGE-BASED LEARNING - ENGAGE

Common Big Idea:
Sustainable Parking

Essential question:
*How do we achieve
a more efficient parking
management?*

Challenge:
*Increase the efficiency in
parking management.*

CHALLENGE-BASED LEARNING - ENGAGE

Brainstorming on parking conditions (needs, type of parking etc.)

"Customers"
   visitors, tourists
   customers

   employees
   students
   service (social, technical)

Private vs. Public parking area

On-street vs. Off-street parking

Parking zones

A point of interest around

Charger for electrical vehicles

CHALLENGE-BASED LEARNING **–** ENGAGE

Different challenges identified – examples

Private off-street parking for non-residents: create an information system decreasing lost time of drivers

Private off-street parking for non-residents: create a reservation system increasing the efficiency of parking area

Private off-street parking for residents: offer parking spaces to the public when residents do not need them

Public on-street parking: setting an appropriate policy of payment

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CHALLENGE-BASED LEARNING **–** INVESTIGATE

Guiding questions:
Brainstorming for selected challenge

CHALLENGE-BASED LEARNING – INVESTIGATE

Private off-street parking for non-residents: create an information system decreasing lost time of drivers

Who are „customers"?

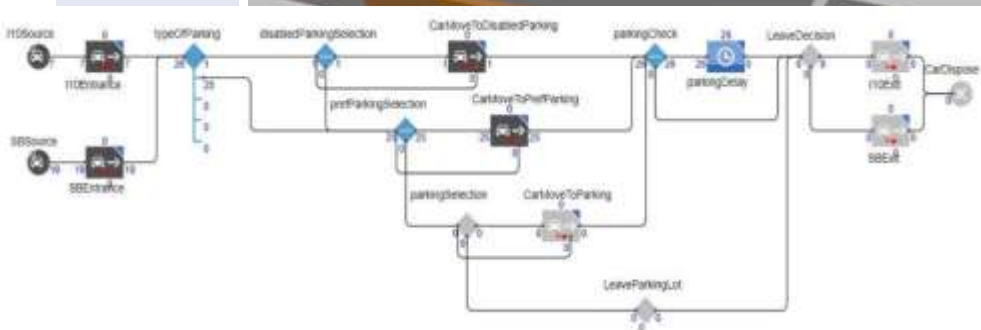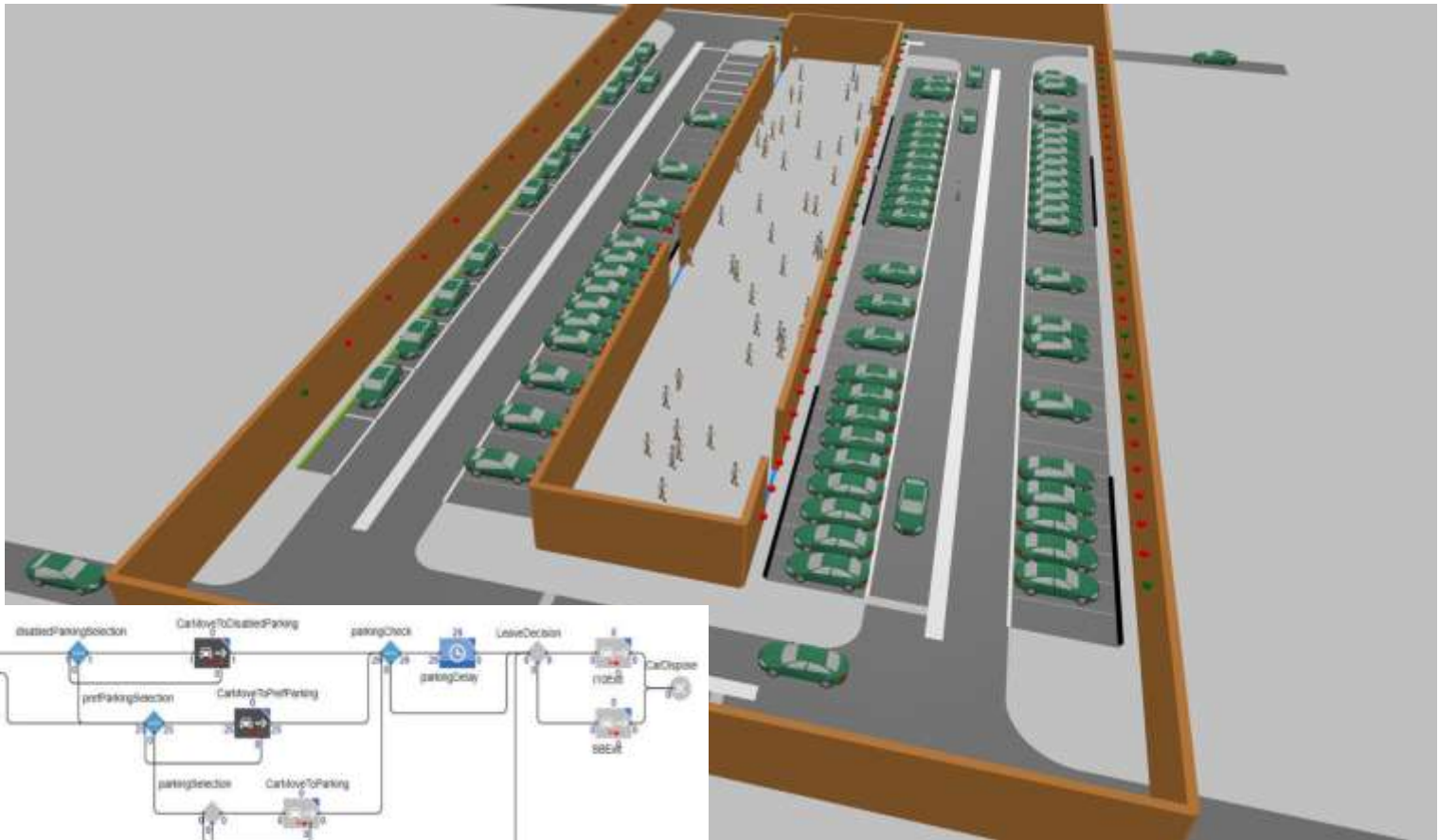**What information is helpful?**

How to transmit the information to drivers?

How to determine lost time?

Guiding questions:
Brainstorming on specific challenge

Guiding Activities:
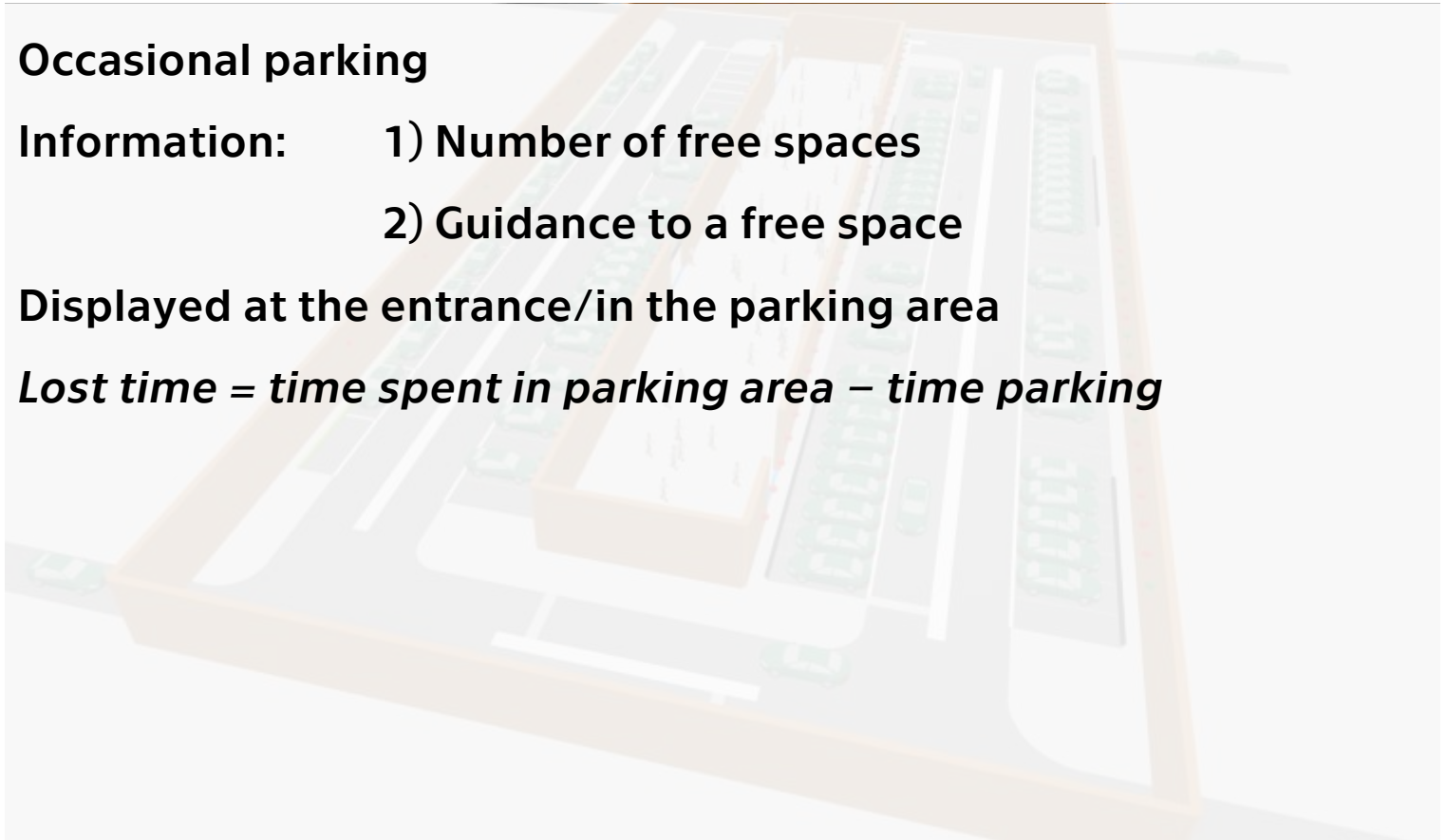*Create a model for given parking problem*

Occasional parking

Information: 1) **Number of free spaces**

   2) **Guidance to a free space**

Displayed at the entrance/in the parking area

Lost time = time spent in parking area − time parking

CHALLENGE-BASED LEARNING **–** INVESTIGATE

Guiding questions:
Brainstorming on specific challenge

Guiding Activities:
Create a model for given parking problem

Analysis:
Analysis of simulation results.

CHALLENGE-BASED LEARNING - ACT

Not included in the subject.

Students are encouraged to perform this phase within their project resulting in Master's Theses

CONCLUSIONS AND REFLECTIONS

- **Smart City Design is a suitable subject for the first two phases of CBL**

- **CBL is suitable for projects being solved**

- **Brainstorming was identified as a powerful tool**

Thank you for your attention