

# Bridging the gap between field- and lab-based user studies for location-based services

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# Evaluating LBS: Some Challenges

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- context dependence
- system appropriation
- cost of deployment, testing
- effort required to (design, develop and) evaluate LBS
- different means of interaction
- (very) diverse user groups
- different devices
- ...



# Field studies and lab-based studies

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- **field study**
  - actual use context  
(ecological validity)
  - little control/repeatability
- **lab study**
  - little context
  - almost full control
- **how to pick method best suited for research question?**
- **cost-benefit?**



# Related Work

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- survey of evaluation methods by Kjeldskov & Paay (2012)
  - shift from engineering-driven to empirical research
  - in 2009: lab-based 49%, field studies 35%
  - trend towards longer-term deployment studies
- many evaluation methods, suitable for lab and/or field, e.g. logging, A/V recording, experience-sampling, post-hoc interviews
- long-standing debate: lab vs. field
- alternative: simulate real-world in the lab

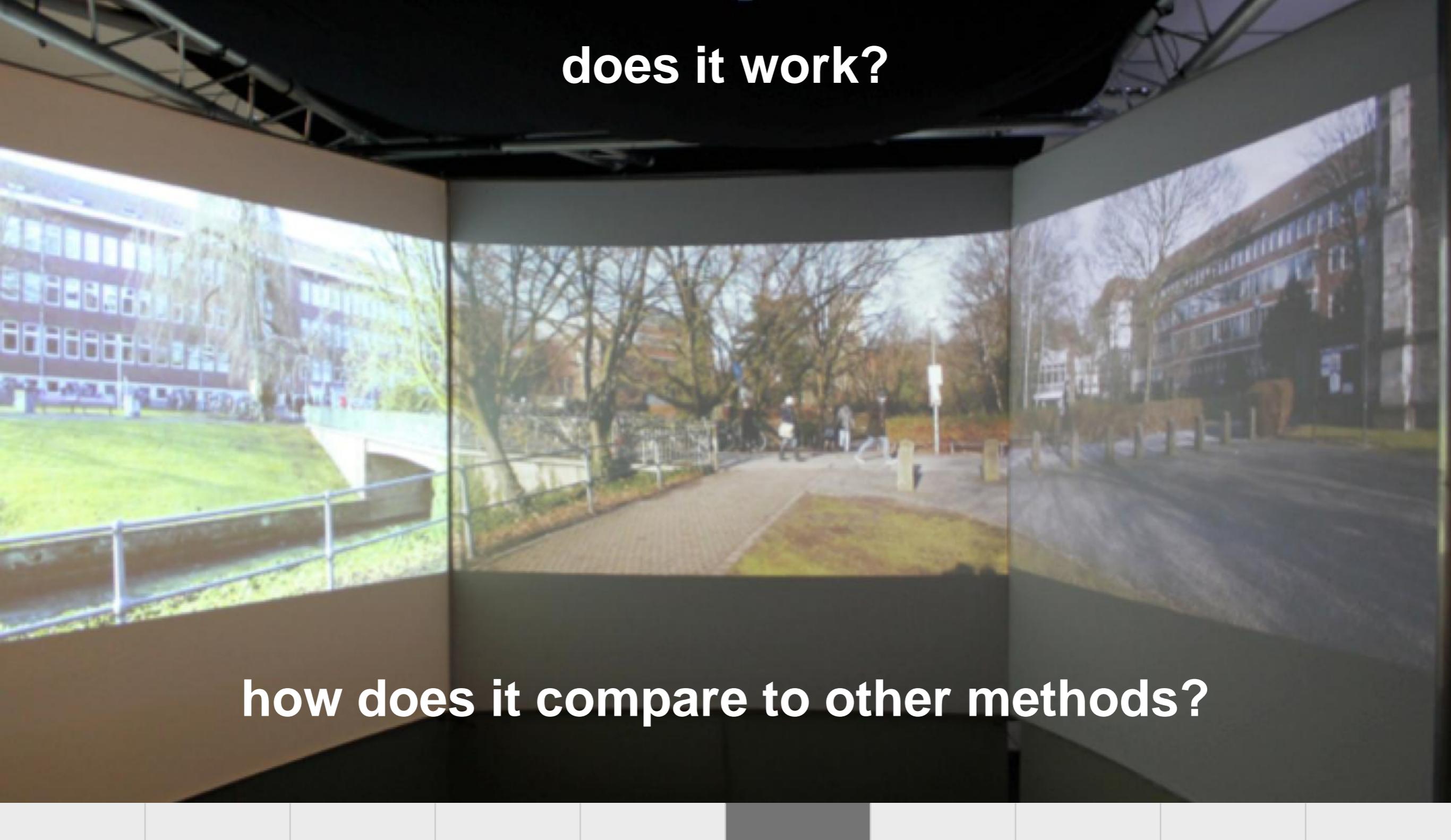
# immersive video environment (IVE)

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**does it work?**

**how does it compare to other methods?**

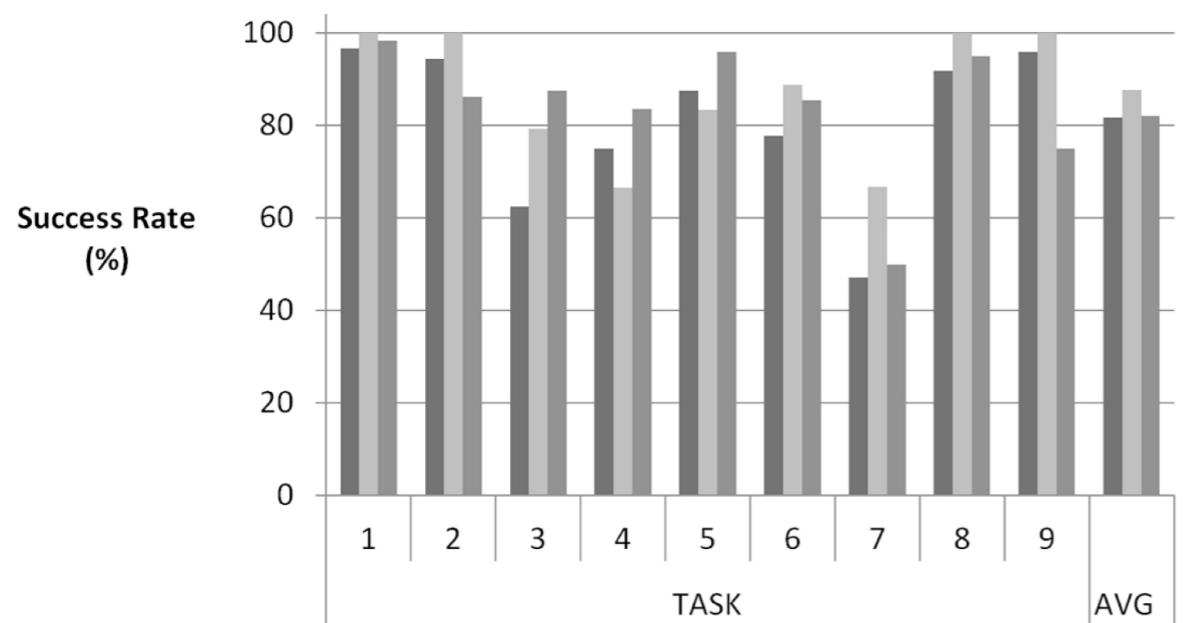
# Comparison Study



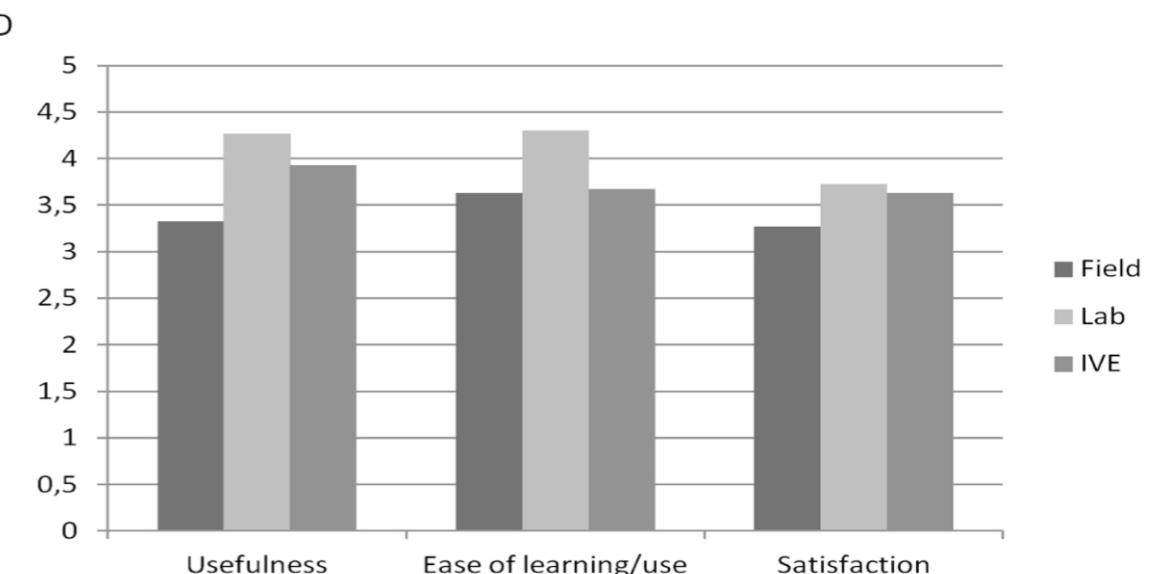
- **goal:** identify properties, strengths and weaknesses
- 18 participants (6 per method), familiar with area/phone
- think-aloud, multi-camera recording, questionnaires
- 9 scenarios/tasks (2-5 subtasks) with Google Maps app

# Key results and observations

- analysis: mostly qualitative, 2 raters transcribed and analysed footage



11 h in total, Ø 37 min



	major	minor
field	9	6
lab	7	5
IVE	8	6

field: 79 min > IVE: 41 min > lab: 40 min  
 IVE hardware:  
 software:  
 capture footage:  
 post-processing:

# Key results and observations

	pros	cons
field	<ul style="list-style-type: none"><li>• most usability problems found</li><li>• testing in target environment</li><li>• stable running costs in the long term, potentially high</li></ul>	<ul style="list-style-type: none"><li>• dependency on weather</li><li>• more difficult to find particip's</li><li>• more time needed per person</li><li>• transportation costs</li></ul>
lab	<ul style="list-style-type: none"><li>• simple setup</li><li>• little space and time needed</li><li>• automation possible</li><li>• relatively low cost</li></ul>	<ul style="list-style-type: none"><li>• very little context</li><li>• performance results differ from real world test</li><li>• limited locomotion</li><li>• test task adjustment needed</li></ul>
IVE	<ul style="list-style-type: none"><li>• partial context present</li><li>• control over context</li><li>• found similar number of major usability problems as in the field</li><li>• automation possible</li></ul>	<ul style="list-style-type: none"><li>• not all context present</li><li>• need to create footage</li><li>• locomotion difficult</li><li>• space requirement in lab</li><li>• high setup cost</li><li>• test task adjustment needed</li></ul>

# Take home message

- immersive video environments (IVEs) show promise as hybrid evaluation method:
  - full control even over context
  - higher ecological validity
  - similar results to field tests
- but:
  - lack of locomotion limiting
  - more research needed
  - as a design tool (video collage)

