'TEACHOUT'

Education Outside the Classroom - *udeskole*

- a large-scale quasi-experimental Danish study 2014-2018

- What conclusions do you draw from the TEACHOUT project?
- What waterproof arguments for teaching outside the classroom can you give to the participants on their way?

Aim

Investigate how **regular *udeskole* during a year** has an impact on pupils physical activity, academic learning, motivation, well-being, and social relations?

Grades three through six (age 9-13)
18 schools, 46 classes (1,013 pupils)
Compare *udeskole* classes with parallel (control) classes

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Zurich, November 23, 2019

Definition of *udeskole* in the TEACHOUT study

- *Udeskole* - teaching and learning practiced outside the school buildings
- In natural and cultural environments
- Regular and curriculum-based teaching during a year (2014-2015)
- Minimum 5 hours a week on one school day or two ½ days

Agenda

- Research team & PhD students involved

- Schools and the recruitment process

- Design and settings

- Main Ph.D. results:
    - Social relations and well being
    - Physical activity
    - Motivation, reading and Math skills

- Challenges and limitations

TEACHOUT project team 2014-2018

The TrygFonden *udeskole* research project 2014-2018

Grant: 6.78 mill. DK = € 0.9 mill.
Budget 10.5 mill. DK = € 1.3 mill.

Partnership:

Department of Nutrition, Exercise & Sport Sciences, University of Copenhagen (NEXS)

Department of Geosciences and Natural Resource Management (IGN)
University of Copenhagen

Steno Health Promotion Center, Steno Diabetes Center A/S

VIA University College, Århus

University of Southern Denmark

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Niels E. Ernst, Accociate Professor
Via University College & The Forestry College IGN
University of Copenhagen

Peter Bentsen, Senior researcher,
Steno Health Promotion Center,
Steno Diabetes Center A / S.

Jasper Schipperijn, Associate Professor,
Department of Sports Science and Clinical Biomechanics Active Living

PhD students investigating grade 3-6 pupils:

Study 1

Physical activity

Study 2

Learning – Motivation, reading and Math skills

Study 3

Social relations, motivation and well-being

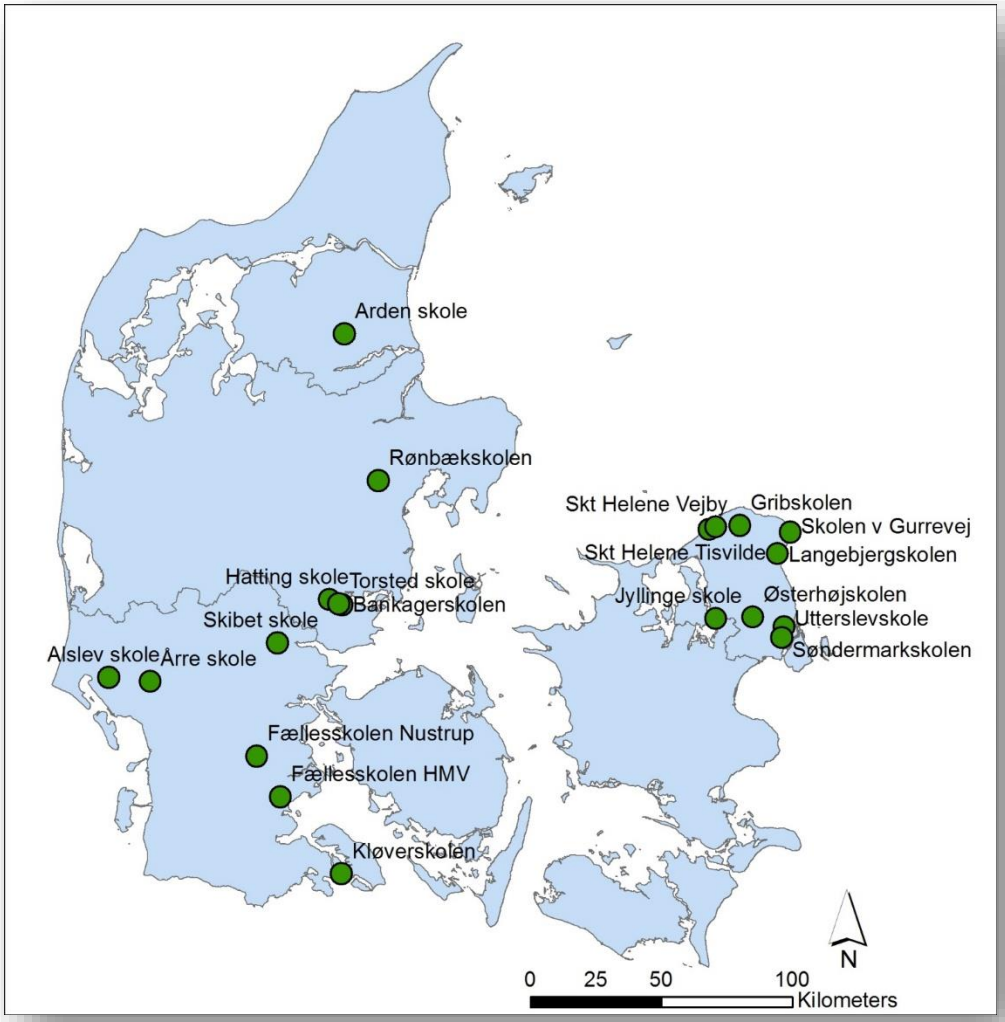
……

Experienced *udeskole* teachers:

Study 4

Perspectives on didactics and the teacher's work

Schools participation in the TEACHOUT study

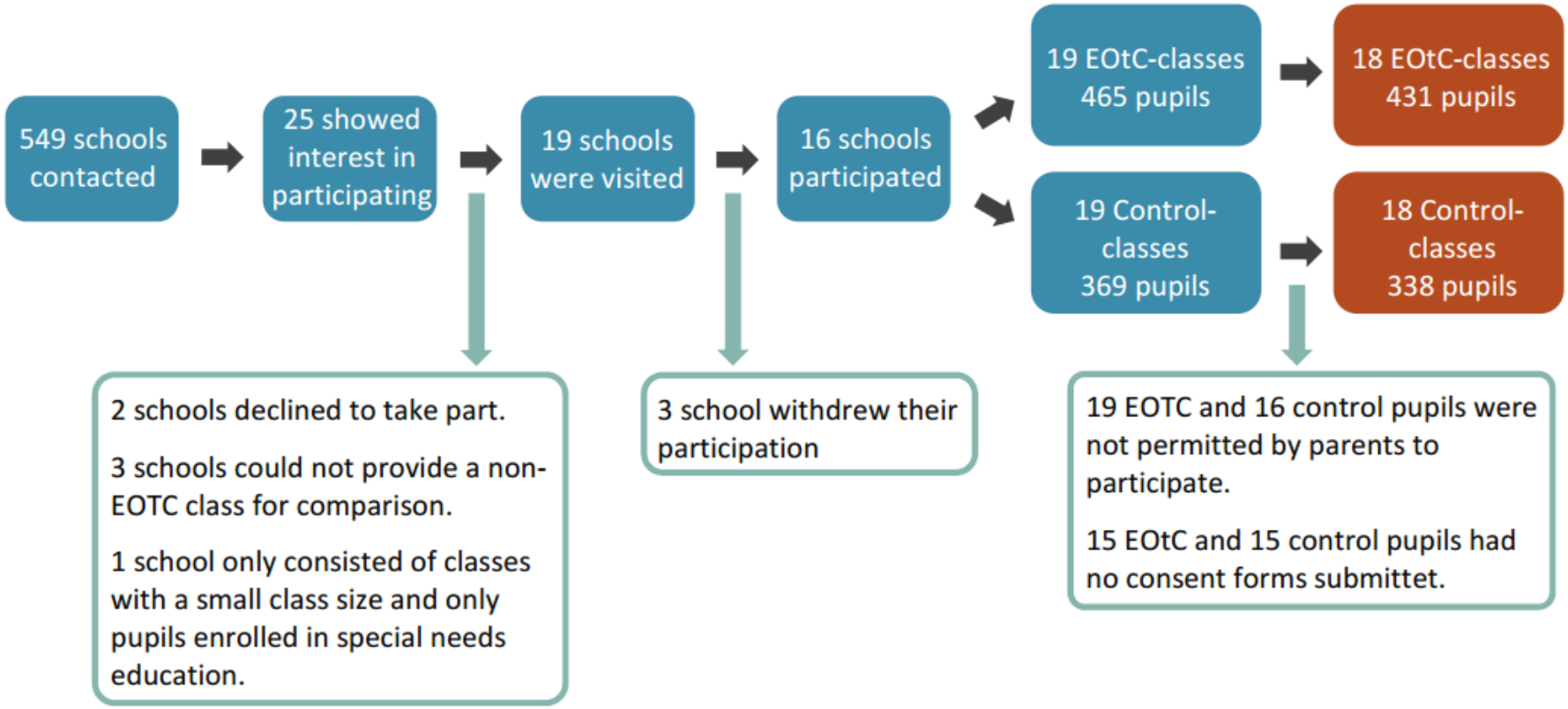


16 schools fullfilled the inclusion criteria and participated

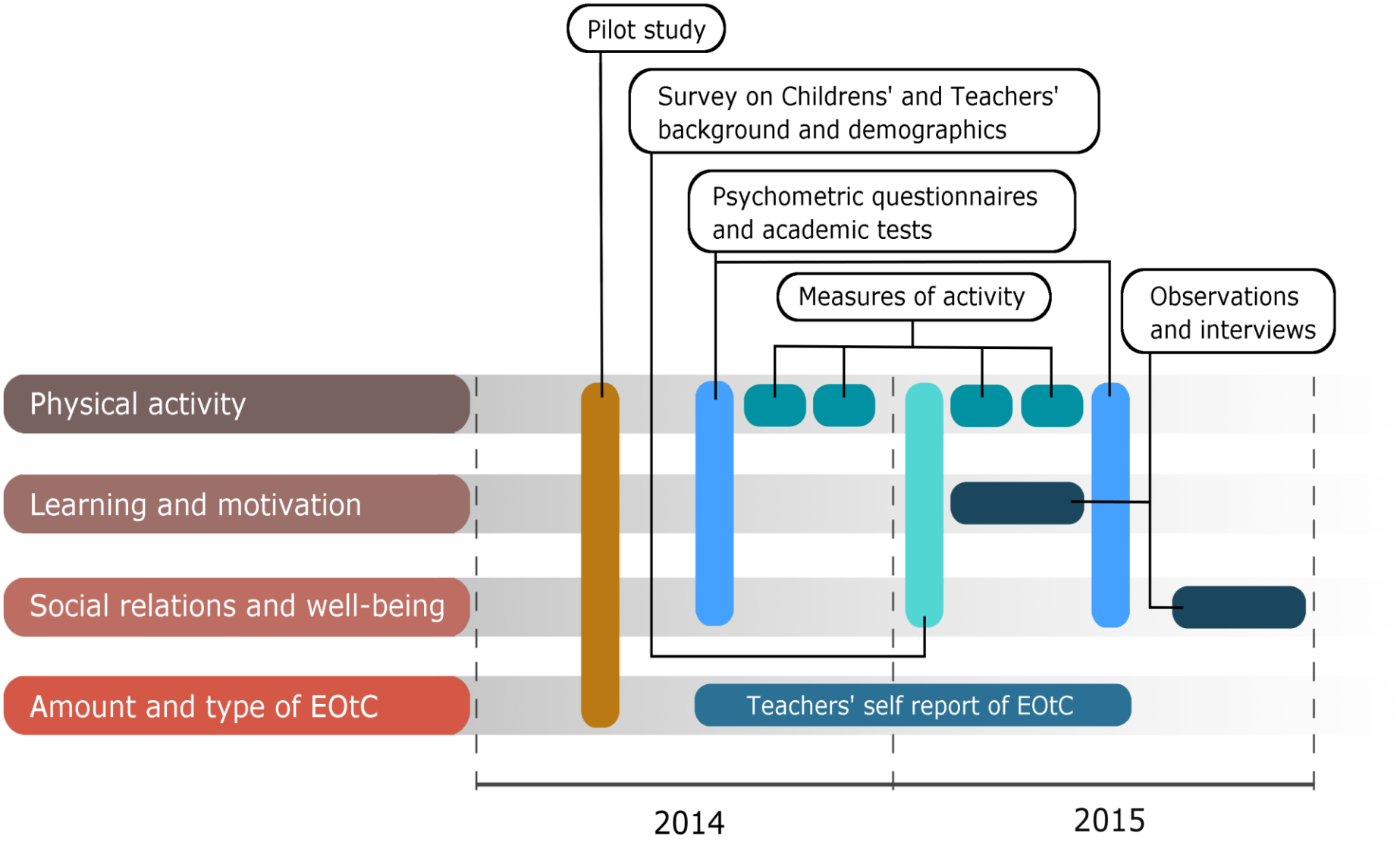
18 *udeskole* and 18 parallel classes were analysed

Data collection from September 2014 – June 2015

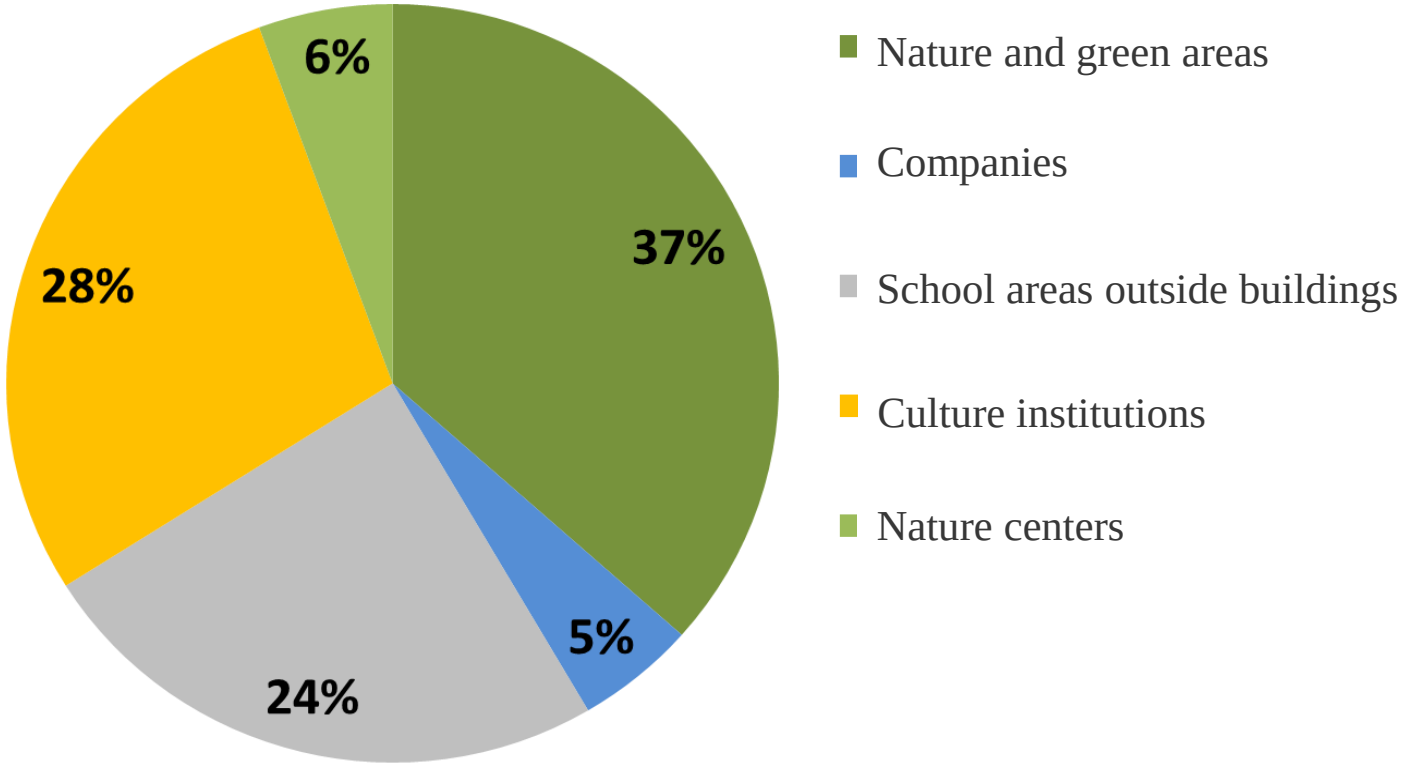
Stages in the recruitment proces



Design – overview

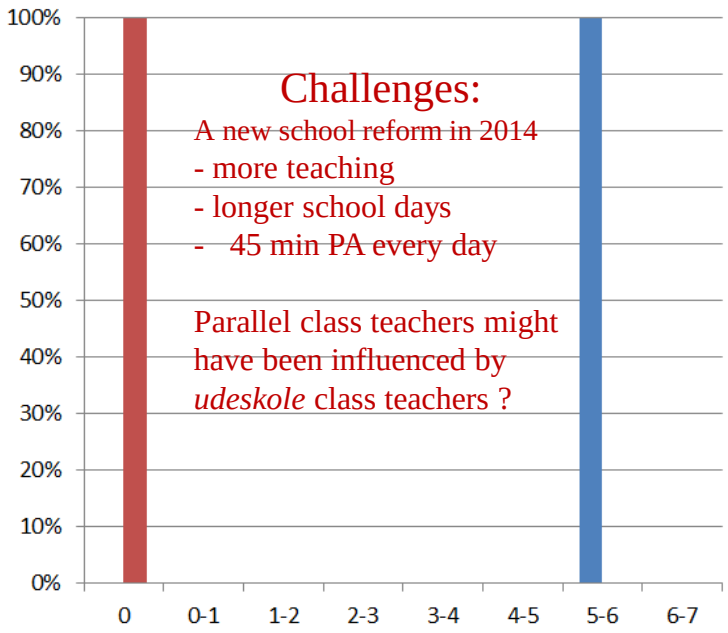


Settings used by teachers in the TEACHOUT study (2014-15)



Pupils exposure to *udeskole?*
Assumption: 'An ideal situation'

Proportion of classes



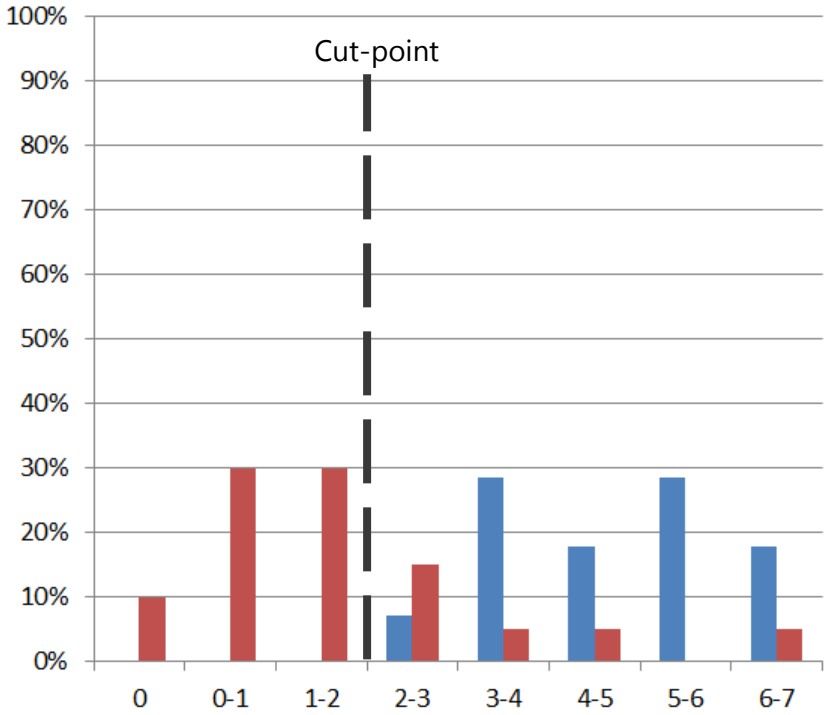
***Udeskole* classes**

Parallel – control - classes

Hours *udeskole* pr. week
(mean)

Exposure: *udeskole* - practice

Proportion of classes



Hours *udeskole* pr. week
(mean)

Udeskole classes (N=28)

Parallel (control) classes (N=20)

Well-being and social relations in *udeskole*

PhD Mads Bølling

Do pupils psychological well-being and social relations improve using *udeskole* as a teaching method?

- different groups of pupils ?

Results

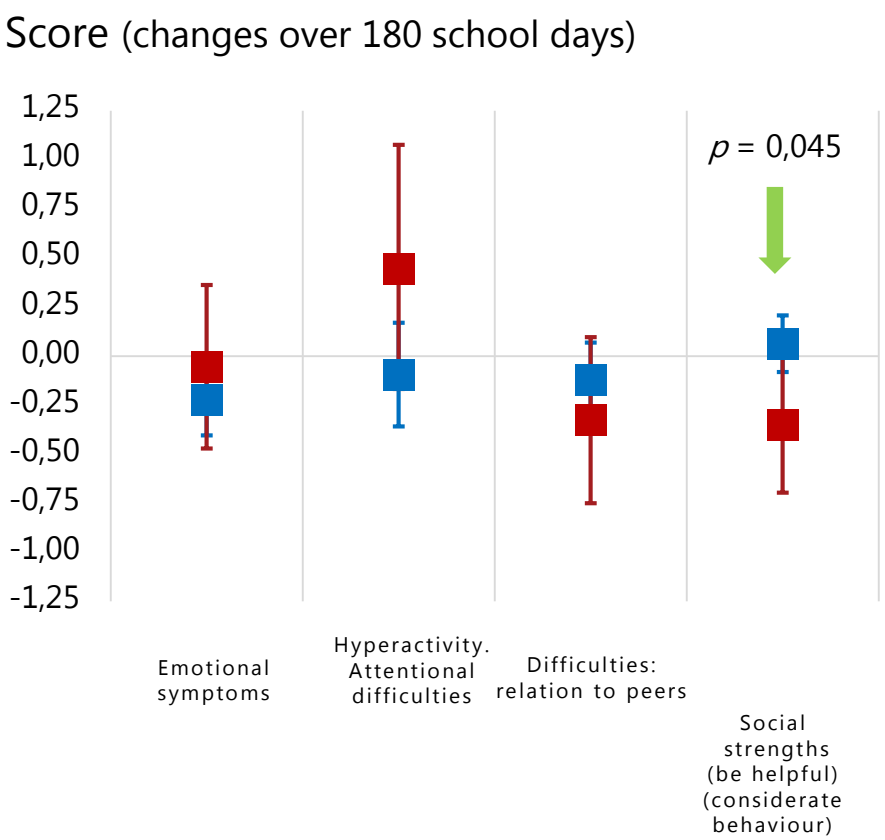
- Prosocial behavior and social relations improved significantly
- New peer affiliations took place
- No associations depended on gender
- For pupils of low socioeconomic status negative associations were found between regular exposure to *udeskole* and hyperactivity-inattention problems and peer problems

Conclusion

Regular exposure to *udeskole* have positive associations with children's social well-being and a positive impact on creating new peer relations

Results: psycological well-being

(Strength & Difficulties Questionaire (SDQ) score)



Udeskole group
(*n* = 511, *N* = 619)
4,8±1,3 hours *udeskole* mean pr. week

Control group
(*n* = 56, *N* = 435)
0,6±0,8 hours *udeskole* mean pr. week

Error bars: 95% confidence interval

Results: Social relations

Social Cognitive Mapping (SCM)

New pair- relations **3,7%** (CI±4,0%) (*p* = 0,033)
i.e. ~0,8 more relations in a class with 22 pupils

Linear mixed model

***Udeskole*-group**
(*n* = 332, *N* = 619)

5,04±1,06 hours *udeskole,* mean pr. week

Control group
(*n* = 116, *N* = 435)

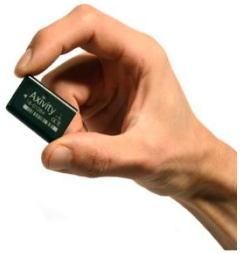
0,73±0,75 timer *udeskole,* mean pr. week

Physical Activity

Ph.d., Mikkel Bo Schneller

This thesis investigates:

1) Compliance and within-subject reliability of free-living PA measurements using skin-taped AX3 accelerometers



2) effects of an *udeskole* intervention on children's weekly PA

3) differences in PA levels between domains and day types, comparing *udeskole* time with classroom time.

Udeskole classes	Parallel (control) classes
503 pupils	357 pupils
(237 boys, 266 girls)	(170 boys, 187 girls)

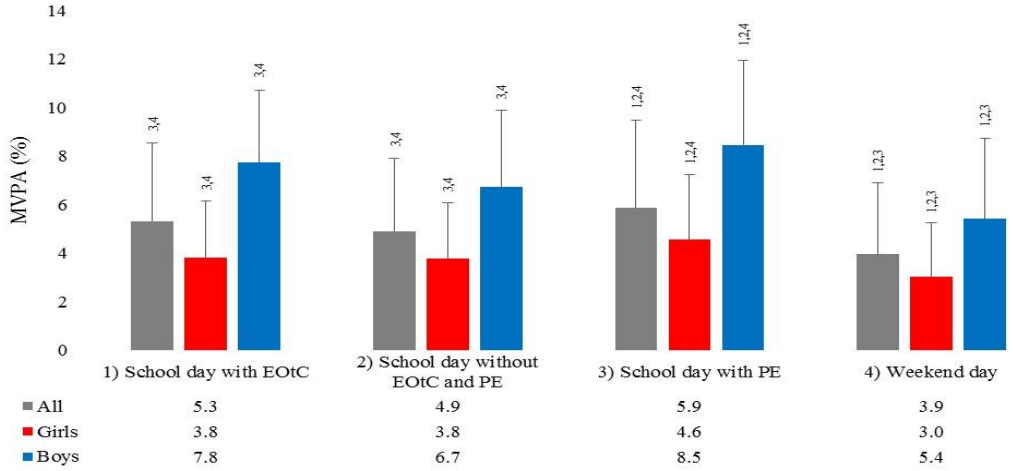
Results

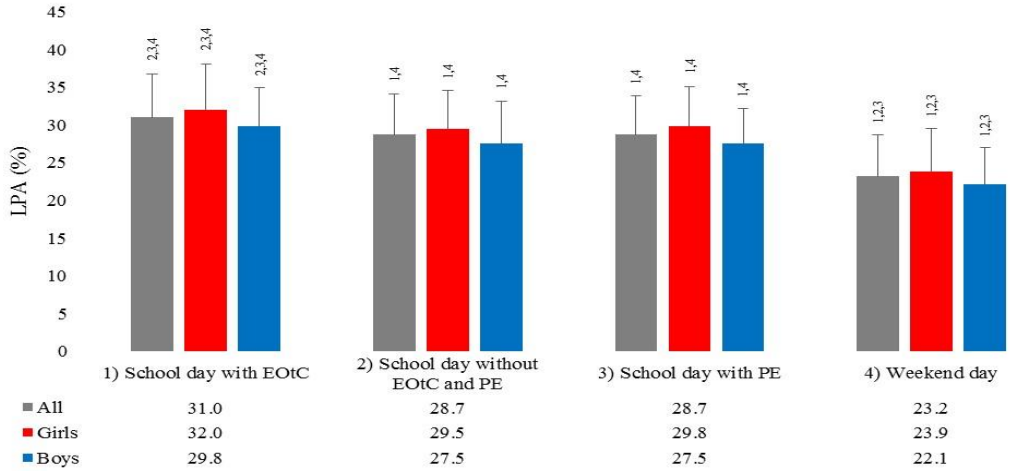
- Boys in *udeskole* classes spent more weekly time (24/7) in moderate-to-vigorous physical activity (MVPA) compared to the control boys group
  - No difference was found for girls in udeskole and control groups.
- *Udeskole* days were associated with more light physical activity (LPA) than traditional school days (without PE lessons)
- Boys spent a significant higher proportion of time in MVPA than girls in all domains
- Girls in the *udeskole* domain showed higher LPA compared to the classroom domain.

Conclusion

- *Udeskole* days were in particular beneficial to boys with higher proportions of time at MVPA intensities
- *Udeskole* days created more PA than days without PE.
- From a health perspective *udeskole* teachers (all teachers) might reflect on how to stimulate girls PA
- **In general *udeskole* stimulate to higher physical activity**

PA in different domains and gender intensities





Potential effects of regular udeskole (EOtC)

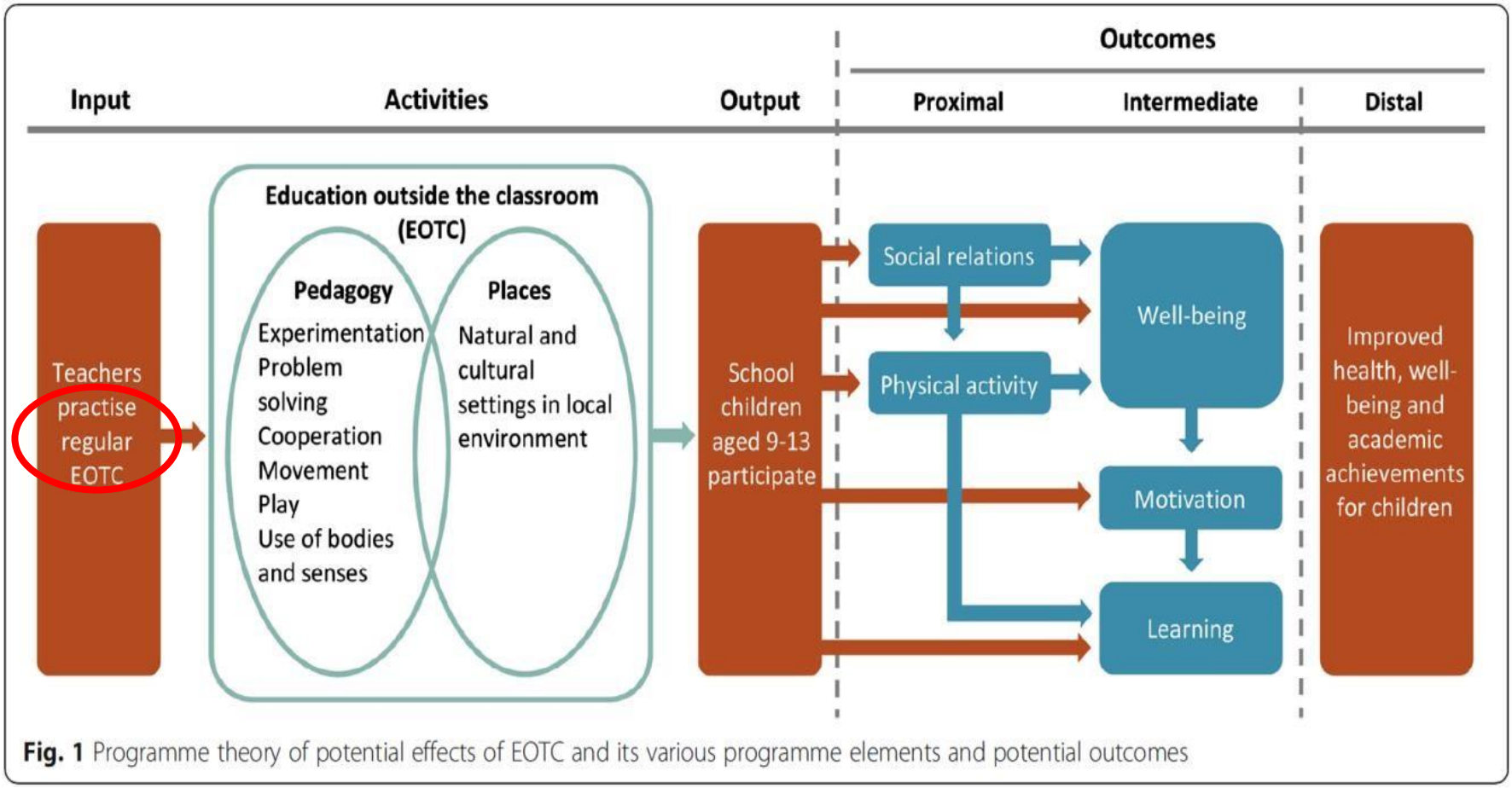


Fig. 1 Programme theory of potential effects of EOTC and its various programme elements and potential outcomes

Learning in *udeskole*

PhD Camilla Roed Otte

Research question

What is the association between pupils motivation for school, skills in reading and math after systematic exposure to *udeskole* during a year?

Results

- Pupils from the *udeskole* group had a significant higher score on intrinsic motivation than the control group

- Pupils exposed to *udeskole* (around 5 hours) had a significantly better result in reading that the control group
  - The results did not depend on gender or the amount of Danish lessons (mother tongue) in *udeskole*
- No significant difference was found in Math skills/ tests after a year with *udeskole* (8.5% better) as compared to the control group (6.5% better)

Conclusion

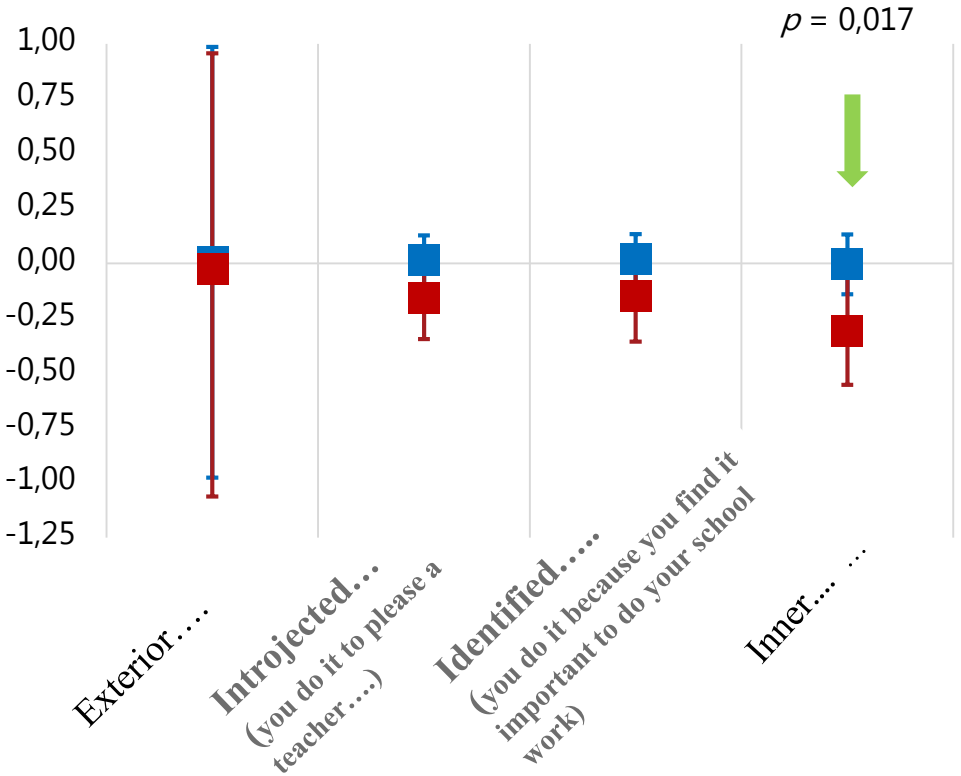
The results are in line with previous studies, and the thesis illustrates that *udeskole* can promote pupils skills in reading and improve their intrinsic motivation.

No differences in math tests (skills) between the *udeskole* and control groups.

Results school motivation

(Academic Self-Regulation Questionnaire (SRQ-A)

Motivation-score (changes over 180 school-days)



Udeskole-group
(*n* = 311, *N* = 619)
4,93±1,23 hours *udeskole* mean pr week

Control group
(*n* = 56, *N* = 435)
1,07±0,90 hours *udeskole* mean pr. week

Error bars: 95% CI
Linear mixed model

TEACHOUT limitations

- The new school reform in 2014
- Control class teachers might have been influenced their udeskole-class-collegues?? (motivated to do some kind of udeskole?)
- We do not know how *udeskole* teachers taught in- and outside the classroom?
  - neither the parallel class teachers?

Future recommendations

- Longer lasting studies (large scaled two or three years)
- More knowledge about how udeskole TEACHOUT teach in- and outside the classroom
- Integration of *udeskole* modules in all 18 Danish teacher educations

12 ph.d. TEACHOUT peer reviewed publications

Barfod, K., Ejbye-Ernst, N., Mygind, L. & Bentsen, P. (2016). Increased provision of *udeskole* in Danish schools: an updated national population survey. *Urban Forestry & Urban Greening*, 20(1), 277-281.

Barfod, K. S., & Daugbjerg, P. (2018). Potentials in Udeskole: Inquiry-Based Teaching Outside the Classroom. *Frontiers in Education*, *3*.

Barfod, K. S. (2017). Maintaining mastery but feeling professionally isolated: experienced teachers' perceptions of teaching outside the classroom. *Journal of Adventure Education and Outdoor Learning*, 1–13.

Bølling, M., Pfister, G. U., Mygind, E., & Nielsen, G. (2019). Education outside the classroom and pupils' social relations? A one-year quasi-experiment. *International Journal of Educational Research*, *94*, 29-41.

Bølling, M., Niclasen, J., Bentsen, P., & Nielsen, G. (2019). Association of Education Outside the Classroom and Pupils' Psychosocial Well-Being: Results From a School Year Implementation. *Journal of school health*, *89* (3), 210-218.

Bølling, M., Niclasen, J., Bentsen, P., & Nielsen, G. (2019). Association of Education Outside the Classroom and Pupils' Psychosocial Well-being: Results from a School Year Implementation. *Journal of School Health*.

Bølling, M., Otte, C. R.1, Elsborg, P., Nielsen, G., & Bentsen, P. (2018). The association between education outside the classroom and students' school motivation: Results from a one-school-year quasi-experiment. *International Journal of Educational Research*, 89, 2235.

Otte, C. R., Bølling, M., Stevenson, M. P., Ejbye-Ernst, N., Nielsen, G., & Bentsen, P. (2019). Education outside the classroom increases children's reading performance: Results from a one-year quasi-experimental study. *International Journal of Educational Research*, *94*, 42-51.

Otte, C. R., Bølling, M., Elsborg, P., Nielsen, G., & Bentsen, P. (2019). Teaching maths outside the classroom: does it make a difference? *Educational Research*, *61* (1), 38-52.

Schneller, M.B., Bentsen, P., Nielsen, G., Brønd, J.C., Ried-Larsen, M., Mygind, E., & Schipperijn, J. (2017). Measuring Children's Physical Activity: Compliance Using Skin-taped Accelerometers. *Medicine & Science in Sports & Exercise*, 49(6), 1261-1269.

Schneller, M.B., Duncan, S., Schipperijn, J., Nielsen, G., & Mygind, E., & Bentsen, P. (2017). Are children participating in a quasi-experimental education outside the classroom intervention more physically active? *BMC Public Health*, 17(1), 523.

Schneller, M.B., Schipperijn, J., Nielsen, G., & Bentsen, P. (2017). Children's physical activity during a segmented school week: results from a quasi-experimental education outside the classroom intervention. *International Journal of Behavioral Nutrition and Physical Activity*, 14(1), 80.

12 TEACHOUT related – peer reviewed publications and book chapters

Barfod. K. & Bentsen, P. (2018). Don't ask how outdoor education can be integrated into the school curriculum; ask how the school curriculum can be taught outside the classroom. Curriculum Perspectives, 38(2), 151-156.

Bentsen, P., Bonde, A.H., Schneller, M.B., Danielsen, D., Bruselius-Jensen, M., & Aagaard-Hansen, J. (2018). Danish 'add'-in school-based health promotion: integrating health in curriculum time [accepted in Health Promotion International].

Bentsen, P., Nielsen, G., Bølling, M., Mygind, L., Stevenson, M.P., & Mygind, E. (2019). Greening education: education outside the classroom in natural settings as a school-based health promotion approach for child and youth populations. In: Donnely, A.A. & MacIntyre T.E. (Eds.). Physical Activity in Natural Settings: Green Exercise and Blue Exercise [submitted for publication September 2019]. Routledge.

Bentsen, P., Mygind, E., Barfod, K., & Stevenson, M.P. (2018). Udeskole: education outside the classroom in a Danish context. In: Huang, M.T. & Ho, Y.C.J. (Eds). The Budding and Blooming of Outdoor Education in Diverse Global Contexts [will published in September 2018]. New Taipei City: National Academy for Educational Research, 82-114.

Jørring, A.H., Bølling, M., Nielsen, G., Stevenson, M.P., & Bentsen, P. (2019). Swings and roundabouts? Pupils' experiences of social and academic well-being in education outside the classroom. *Education 3-13*, 0(0), 1–16.

Hartmeyer, R., Stevenson, M.P. & Bentsen, P. (2016). Evaluating design-based formative assessment practices in outdoor science teaching. *Educational Research*, 58(4), 420-441.

Hartmeyer, R., Bølling, M. & Bentsen, P. (2017). Approaching multidimensional forms of knowledge through Personal Meaning Mapping in science integrating teaching outside the classroom. *Instructional Science*, 45(6), 737-750.

Mygind, E., Bølling, M., & Barfod, K. (2018). Primary teachers' experiences with weekly education outside the classroom during a year. *Education 3-13, International Journal of Primary, Elementary and Early Years Education*.

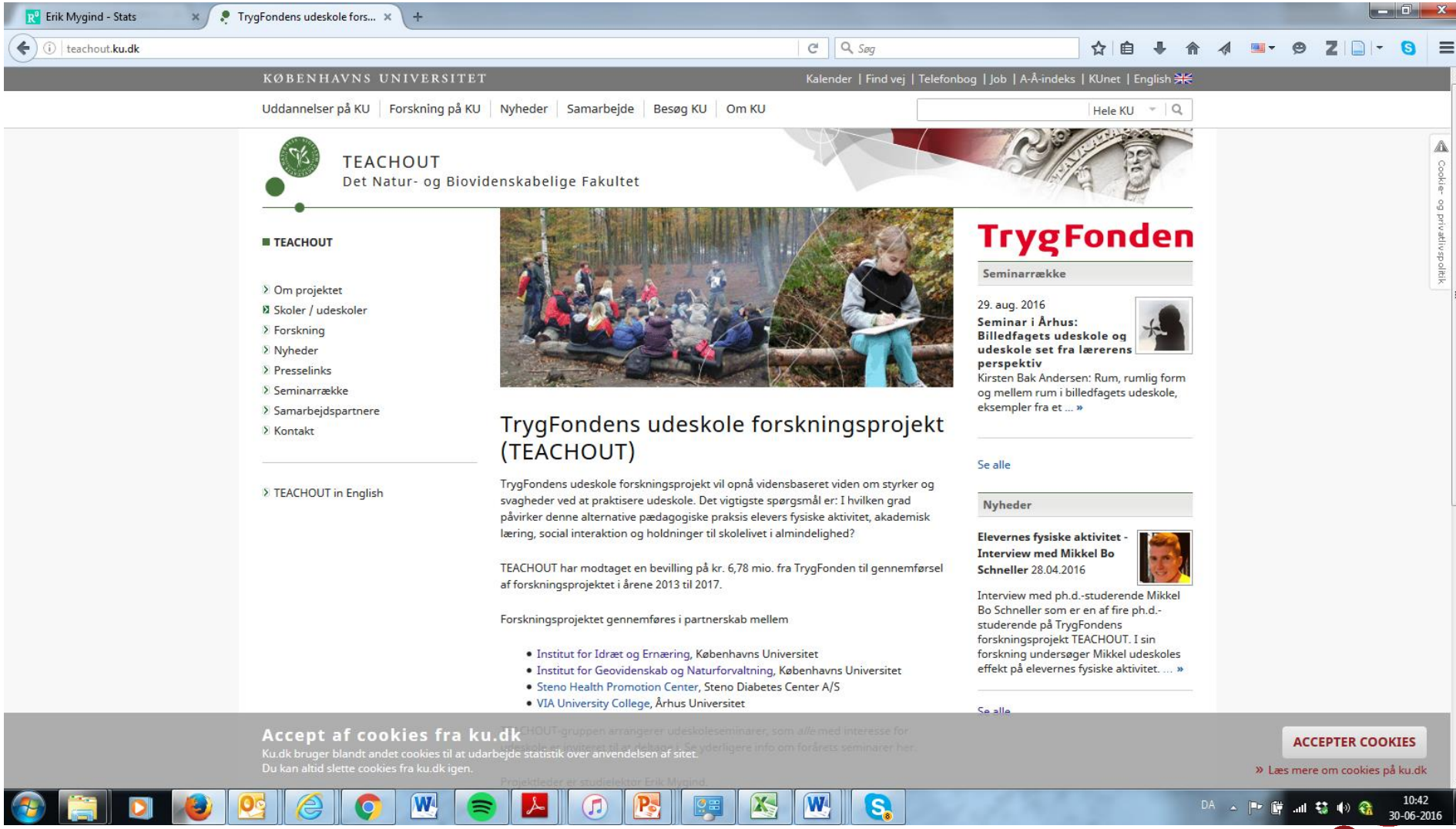
Mygind, L.; Stevenson, M.P.; Liebst, L.S.; Konvalinka, I.; Bentsen, P. (2018) Stress Response and Cognitive Performance Modulation in Classroom versus Natural Environments: A Quasi-Experimental Pilot Study with Children. *Int. J. Environ. Res. Public Health*, *15*, 1098.

Mygind, L., Kryger, T.B, Sidenius, G., Schipperijn, J., & Bentsen, P. (2019). A school excursion to a museum can promote physical activity behaviors in children by integrating movement in curricular activities. European Physical Education Review, 25(19), 35-47.

Nielsen, G., Mygind, E., Bølling, M., Otte, C.R., Schneller, M.B., Ejbye-Ernst, N., Schipperijn, J., & Bentsen, P. (2016). A quasi-experimental cross-disciplinary evaluation of the impacts of Education Outside the Classroom on pupils' physical activity, well-being and learning: the TEACHOUT study protocol. *BMC Public Health*, 16, 1117.

Passy, R., Bentsen, P., Gray, T., & Ho, S. (2019). Integrating outdoor learning into the curriculum: an exploration of work in four nations. *Curriculum Perspectives*, 39(1), 73-78.

https://nexs.ku.dk/forskning/idraet-individ-samfund/forskningsclustre/cluster-1/projekter-cluster1/teachout-liste/



Thanks for listening

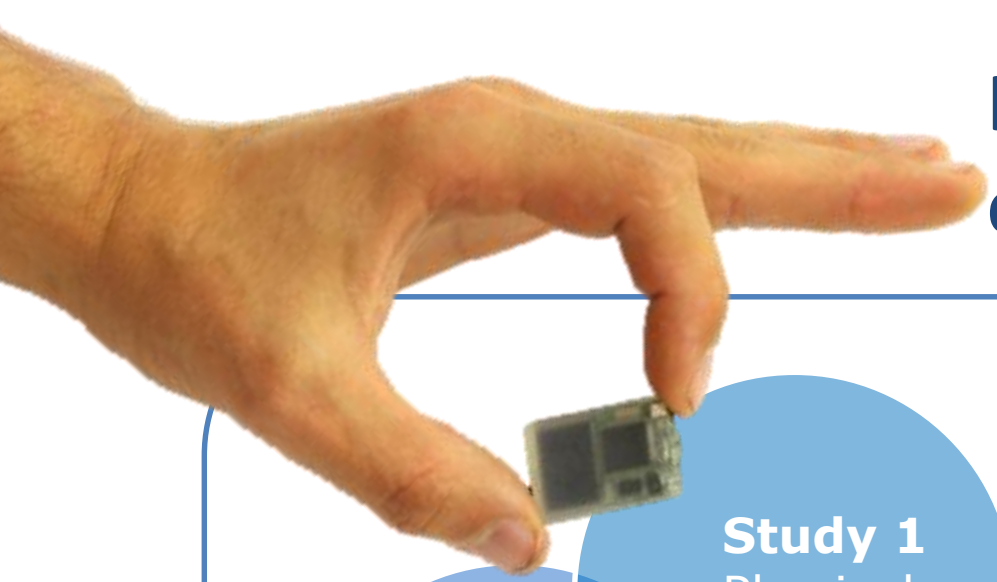
steno diabetes center

KØBENHAVNS UNIVERSITET

VIA UNIVERSITY COLLEGE

Med støtte fra TrygFonden

Interaction, context and cooperation

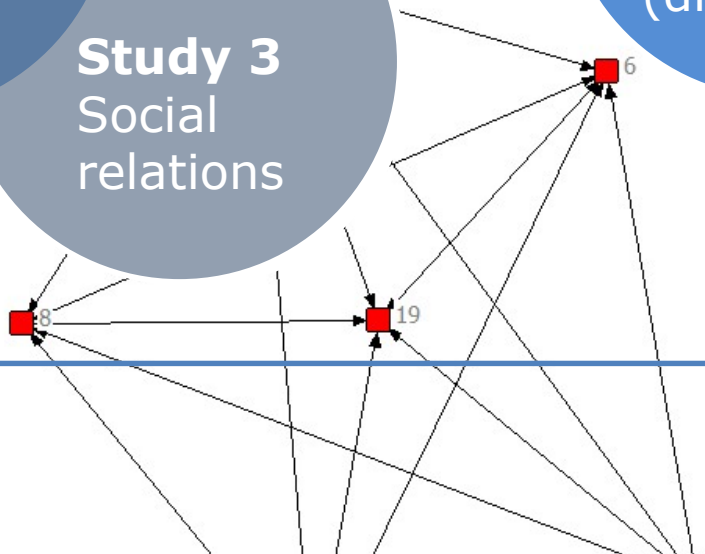


Study 1
Physical activity

Study 2
Learning processes

Study 3
Social relations

Study 4
Teacher and teaching (didactics)



Two more PhD projects added.....

Matt Stevenson: How do natural environments affect cognitive skills in children with and without ADHD?

Rikke Hartmeyer: Integrating teaching outside the classroom in Natural Science and Technology: Exploring, understanding, and developing students' science knowledge through note-link mapping.