

Democratic Practices in Math Education for six-year-olds

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Introduction

- This research is an international, comparative, cross-sectional case study, which investigates features of democracy in curriculum level and
- reports how multiple theoretical aspects of teacher-learner classroom interaction styles (based Pollard 1997;2006; Berk & Winsler, 1997) appear in the formal math learning environments for six-year-old pupils in 3 European (FI, UK, SE) samples. It takes a closer look at possible quite common types of classroom interaction dimensions.
- The focus of this study is on group level classroom interaction research, based on a socio-cultural perspective.

The aim of the study, data and participants

- The aim of the study is to investigate 1) the definitions of democracy in curriculum level and 2) how teacher, shared interaction and learner - oriented classroom interaction dimensions appear in the math lessons
- The analyze is based on 1) curricula documents and 2) video-observations of all math lessons during one study week from each pre- and primary school sample (total 880 min data of MPEG video files) analyzed minute by minute.
- The participants are samples of 6.5 year old learners: (sample Pre1-3) from kindergarten and (sample Sch1) first grade of primary school from Finland, (sample Sch2) second grade of infant school from England and (sample Sch3) preschool in primary school from Sweden.

Democratic Education in curriculum level

DEFINITION of DEMOCRACY:

Equality in the Preschool (OPH 2000, FI) and Primary School (OPH 2001, FI) curriculums*

Diversity and inclusion in the National Curriculum (DfEE 1999, UK).

Solidarity and justice in the preschool classes (Läroplan för förskolan, Lpfö 1998, SE) curriculum.

* Education is a right, not a privilege.

Teacher-Pupil Interaction

focus on math lessons

Minute-for-minute videoanalysis of learning interaction in math lessons (Pollard 1997:2006) during one week in each sample, ON-task:

TEACHER ORIENTATION

- Teacher-centered behaviourism (3) TO
- Teacher-group behaviourism (2) TG

SHARED INTERACTION

- Teacher-pupil socio-constructivism (1) TP
- Pupil-pupil socio-constructivism (-1) PP

LEARNER ORIENTATION

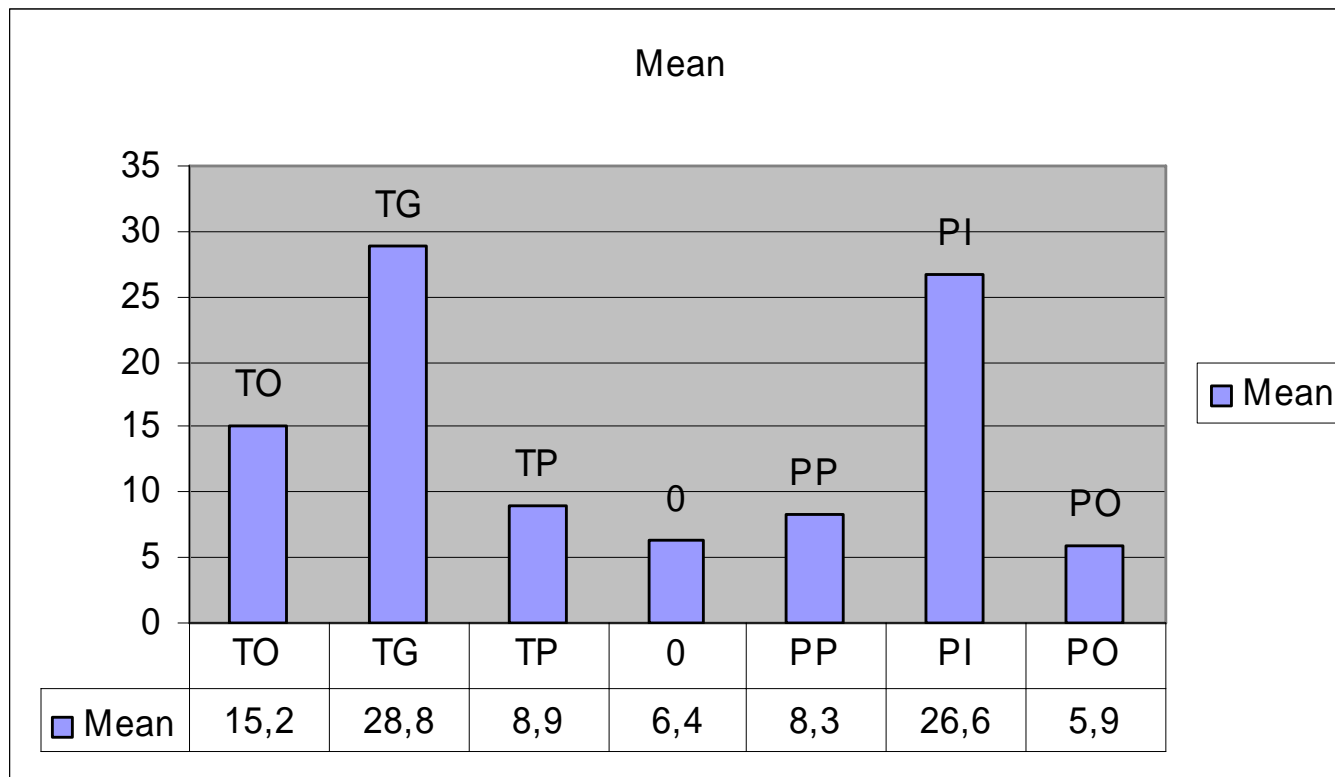
- Pupil's independent constructivism (-2) PI
- Pupil-centered constructivism (-3) PO

OFF-task behaviour:

- Dis/organized (0) Off-task

Results

FIGURE 1. Mean percent of classroom interaction profiles in all samples on whole group level.



Democracy in math Education

Minute for minute analyzed classroom interaction referred to **on-task**:

- **teacher oriented (44%),**
- **shared interaction (17.2%),**
- **learner oriented (32.5%) dimensions**
- **and only 6.4% off- task** behavior during math lessons in ALL these samples
(Pearson Chi-Square Sig. .000)

Meaning of means: Pre 1-3 math lesson interaction model

On-task:

**Shared interaction 35.9%,
Teacher orientation 38.7%,
Learner orientation 22.6%,**

Off-task 2.8%

- 3 preschool groups:
whole-(N=19) & half group (N=10/20) and 2x1/3
Swedish language "bath" group (N=2x8/22).
- 1-2 qualified kindergarten teachers/group & nursery
nurse in whole group
- 1 hour math/week/group
(Total 248 min)

Meaning of means: Sch1. math lesson interaction model

On-task:

Teacher orientation 42.8%,

Learner orientation 42.8%,

Shared interaction 2%,

(Teacher-pupil interaction during independent work)

Off-task 12.4%

- 1 class (N=22)
- 2 teacher trainees, supervised by a qualified teacher
- 3 hours math/week whole class and 2x1h half group
(Total 255 min)

Meaning of means: Sch2. math lesson interaction model

On-task:

Teacher orientation 64.3%,

Shared interaction 18.6%,

Learner orientation 14.3%

Off-task 2.8%

- 1 class (N=30)
- 1 qualified teacher & class assistant
- 4 hours math/week
(total 210 min)

Meaning of means: Sch3. math lesson interaction model

On-task:

Learner orientation 54.4%,

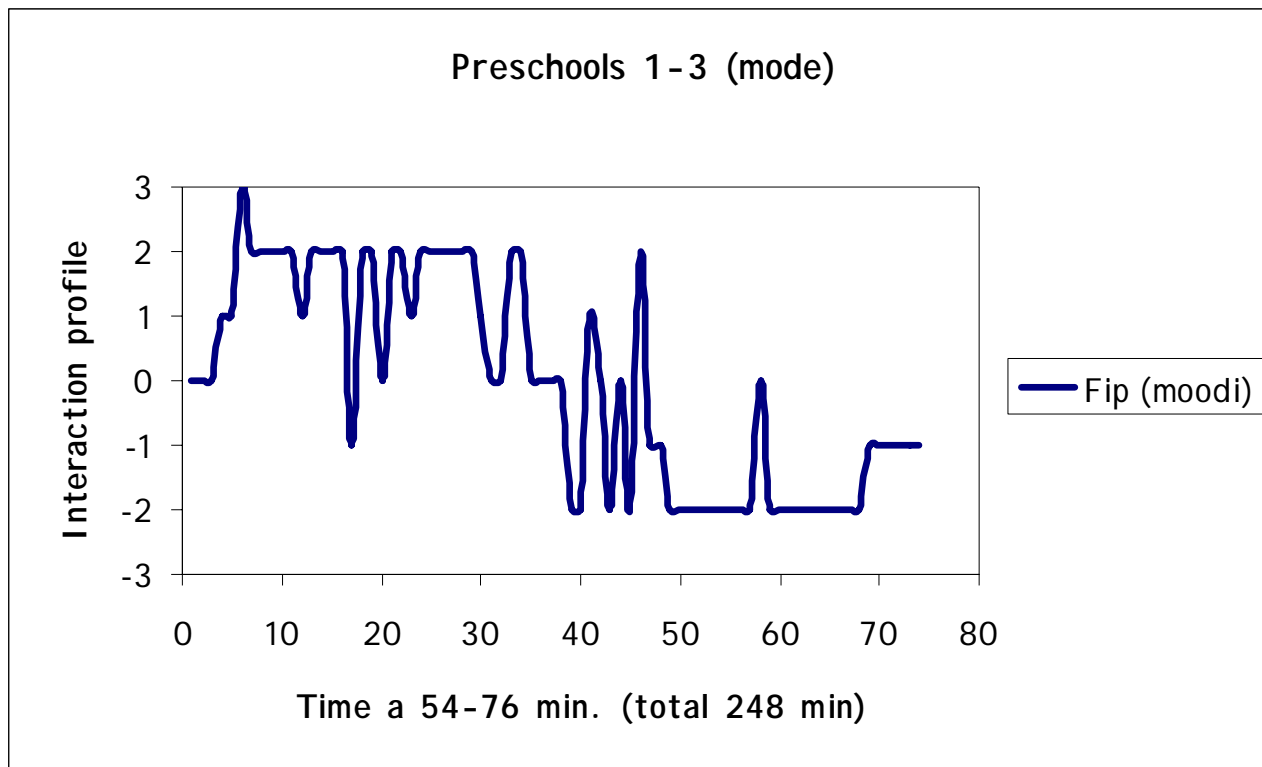
Teacher orientation 28.2%,

Shared interaction 10.8%

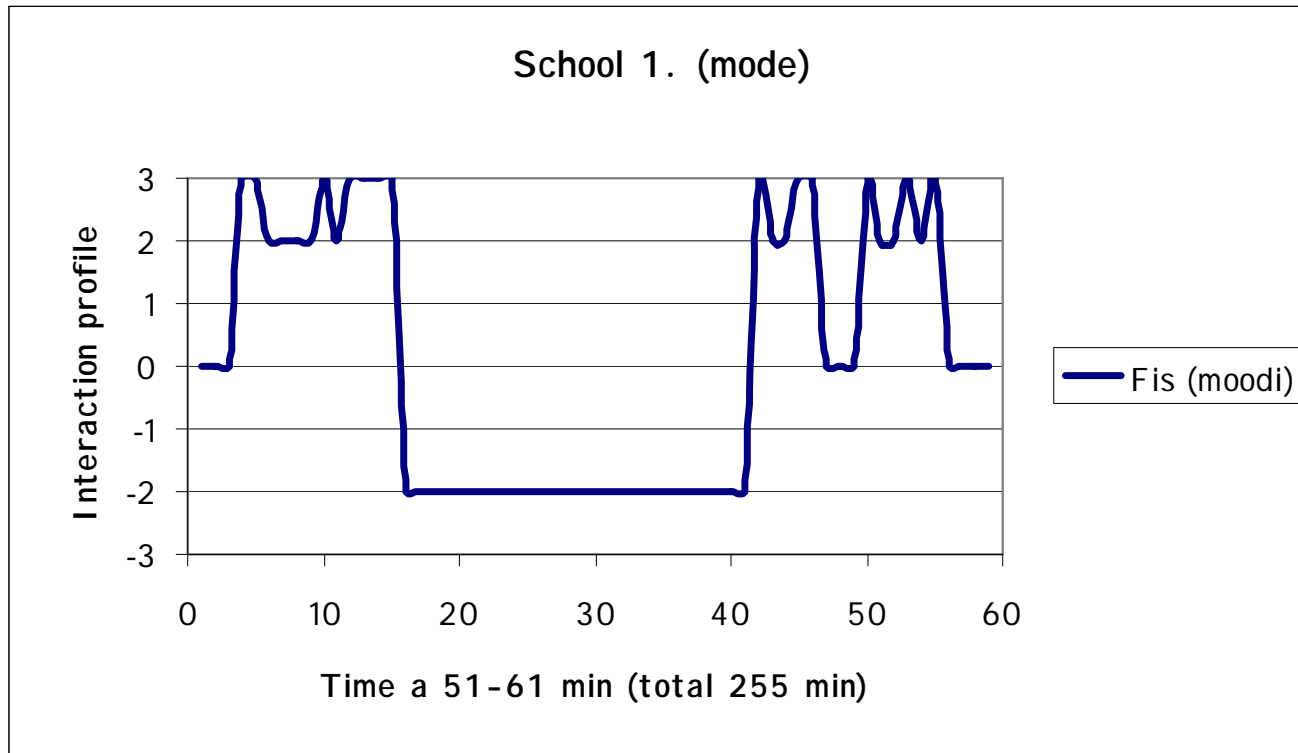
Off-task 6.6%

- 2 preschool groups partly divided into half- (N=16) and 1/3 groups (N=26)
- 2 qualified kindergarten teachers/group & nurse in bigger group
- 1 hour math/week (total 167 min)

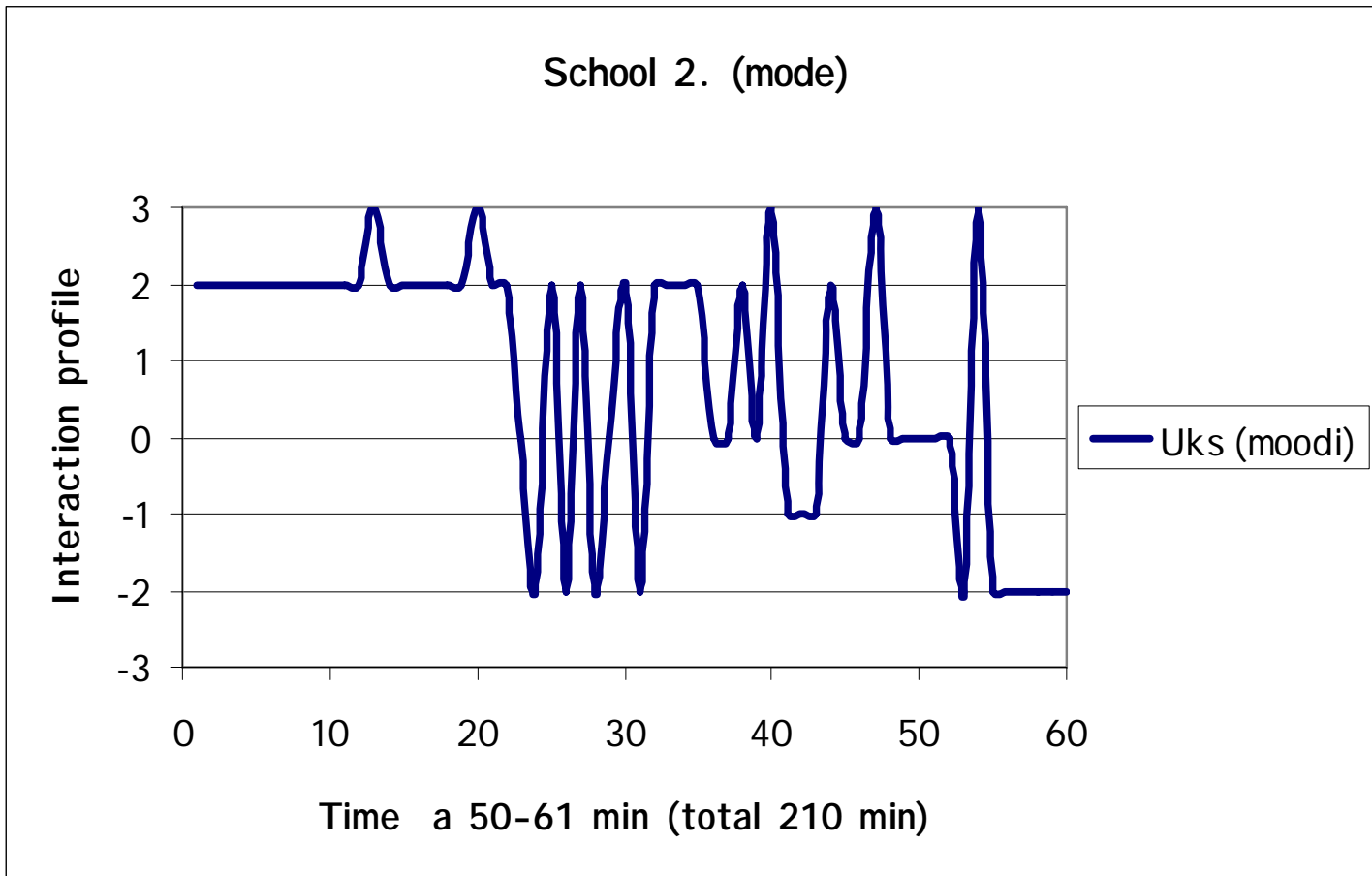
Preschools 1-3 hypothetical weekly interaction profile of math lesson



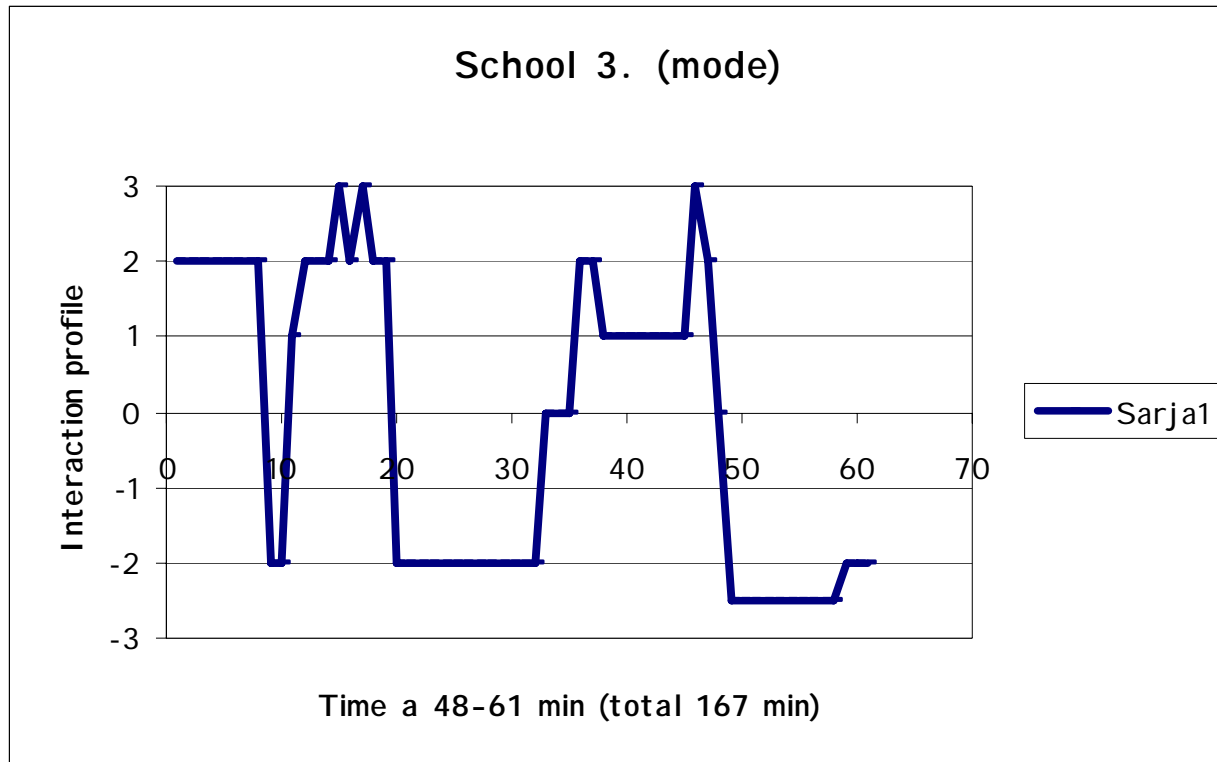
School 1. hypothetical weekly interaction profile of math lesson



School 2. hypothetical weekly interaction profile of math lesson



School 3. hypothetical weekly interaction profile of math lesson



Conclusions: Democracy in Curriculum level and Practices

1. **Equality** in curriculum refers to more than other samples 35.7 % shared interaction in these preschools (OPH 2000, FI), but what about 42.8% teacher- and learner orientation in this primary school (OPH 2001, FI) sample?
2. **Diversity and inclusion** in curriculum refers to 64.3% teacher orientation in this primary school (DfEE 1999, UK), so what?
3. **Solidarity and justice** refers to 54.4% learner orientation in these preschool classes (Läroplan för förskolan, Lpfö 1998, SE).

Does mainly teacher oriented (44%) interaction promote ACTIVE CITIZENSHIP, or should there be more shared interaction (than 17.2%) and learner orientation (than 32.5%) in all these samples?

Do we have DEMOCRATIC PRACTICES IN European education?

Limitations: small sample, short time, 3 languages and on whole class level, but what about the individual learner?