

**HELSINKI 05.04.19**

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**Numeracy, adult migrants and  
bilingual assistants**



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# DISPOSITON

- Introduction

Example film: *The counting system in different languages*

- Numeracy – a part of literacy

What is numeracy or everyday mathematics?

Why numeracy in adult education?

- A resource perspective in numeracy-teaching

Break or continuity?

Arguments of cognition and identity

Learning objectives

Numeracy in all cultures: Mathematical activities

Example films: *Pronunciation of the numbers*, *Words in mathematics*, and *Offers*

- Numeracy-teaching with bilingual assistants

Example - schedule and groups

The teaching – main elements

Midway assessment

Teaching material

# EXAMPLE FILM: THE COUNTING SYSTEM IN DIFFERENT LANGUAGES

What is happening?

- Before the lesson: preparing the bilingual assistants.
- Organizing the groups.
- Teachers' introduction.
- Discussion around the tables in their first language.
- Each group explains the counting system in their language, and we compare the languages.

## EXAMPLE FILM: THE COUNTING SYSTEM IN DIFFERENT LANGUAGES

«Tellemåter» (ways of counting)

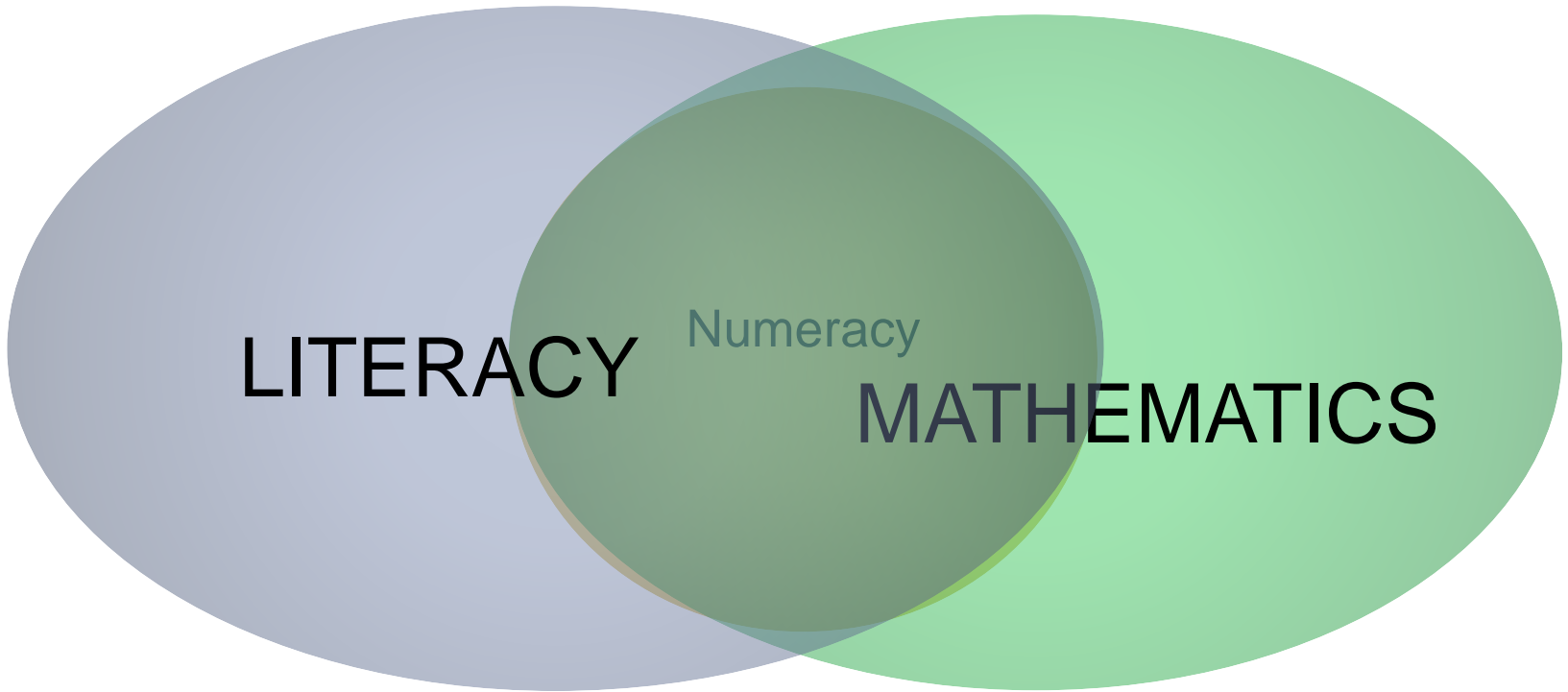
<https://www.kompetansenorge.no/Norsk-og-samfunnskunnskap/Methodisk-veiledning/metodisk-veiledning-basismatematikk-og-bruk-av-sprakhjelpere/>

## LEARNING THE NORWEGIAN COUNTING SYSTEM TOGETHER WITH BILINGUAL ASSISTANTS

- Learning the counting system is the basis for further numeracy learning.
- The students show pride in their own counting system, especially when it appears to be more systematic than the Norwegian system.
- It gives rise to motivation and engagement.
- Comparing the languages – contrastive pedagogy.
- Creating awareness about positive and negative *transfer*.

# NUMERACY – A PART OF BASIC LITERACY





# NUMERACY - A BASIC SKILL



“The ability to access, use, interpret, and communicate mathematical information and ideas in order to engage in and manage the mathematical demands of a range of situations in adult life”

(Fridberg et al., 2015, p.11)





# WHY USE TIME ON NUMERACY?

-WE ALREADY HAVE ENOUGH TO DO TEACHING NORWEGIAN



# WHY ...

- **The functional perspective:** What numeracy skills do the participants need in their daily life? The curriculum says that teaching «should be based on the requirements of each individual learner ...» (my translation, *Læreplan i norsk og samfunnskunnskap for voksne innvandrere*, Vox, 2012).

Ex.: Numeracy skills are crucial for understanding health information.



- **Important work life skills:** Results from the rapport *Adult Skills in the Nordic Region* point to a connection between employment/unemployment and strong/weak performances in numeracy (p. 297).



- **Democratic competence:** Numeracy skills can contribute to participants being critical and active citizens.
- **Working with numeracy is language learning:** Numeracy demands precise language, and it strengthens and develops one's language skills (Knudsen, 2004).

## WHY (CONTINUED) ...

- By including numeracy in teaching, one can contribute to **reducing differences**. (There is a correlation between parents' education and children's results in school).

Parents are intellectual resources for their children.



- Numeracy teaching can play a part in **reducing stress** associated with trying to become part of a new culture.



# A RESOURCE PERSPECTIVE IN NUMERACY TEACHING:

WITH BILINGUAL ASSISTANTS, IT IS EASIER TO *BUILD ON* PARTICIPANTS  
PREVIOUS EXPERIENCE AND KNOWLEDGE

*Break or continuity ...*

The bridge metaphor: To seek building a bridge between  
previous knowledge and new knowledge.

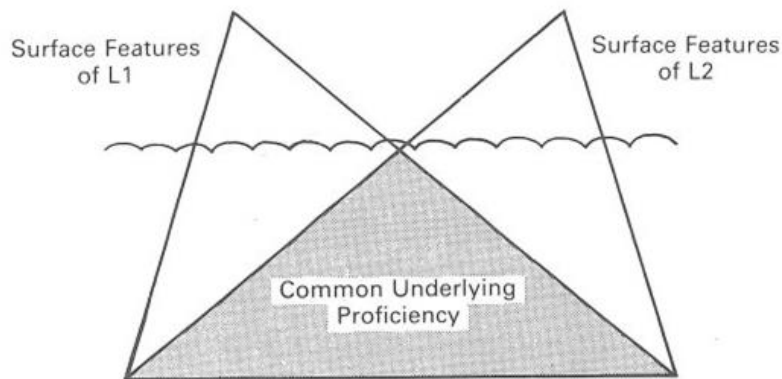


Atlanterhavsveien

## COGNITIVE ARGUMENTS FOR TRYING TO BUILD ON THE PARTICIPANTS' PREVIOUS EXPERIENCE AND RESOURCES WITH THE HELP OF BILINGUAL ASSISTANTS

### CUP: «COMMON UNDERLYING PROFICIENCY» (CUMMINS, 1984)

FIGURE 8 *The “dual iceberg” Representation of Bilingual Proficiency*



«... at deeper levels of conceptual and academic functioning, there is considerable overlap or interdependence across languages. Conceptual knowledge in one language helps to make input in the other language comprehensible” (2000, p. 39).

## COGNITIVE ARGUMENTS ...

- **Transfer:** The influence on one's second language from the learner's first language (Cook, 2016, p. 96)

Ex.: The way of counting in one's first language has the potential of both positive and negative transfer onto one's second language.

By observing the similarities and differences in counting between different languages, one can heighten one's awareness when it comes to systems of counting (Löwing & Kilborn, 2013)

# ARGUMENTS RELATED TO IDENTITY

## (FOR USING BILINGUAL ASSISTANTS IN NUMERACY TEACHING)

- «**Funds of knowledge**» (González et al., 2001, p. 116) .

Adults have a lot of knowledge from home and society. What happens with this knowledge?

- **Identity and empowerment**

As teachers, we can either teach as if delivering a knowledge-package, or we can contribute to an approach to teaching where cultural background is affirmed («The pedagogy of the oppressed», Paulo Freire, 1970)

- «**Adults are their experiences**»

Malcolm Knowles claims that adults *are* their experiences, and when previous experiences are excluded they will feel insulted (reference in Alver & Dregelid, 2016).

... teaching that affirms the identity and sociocultural experiences of the individual has a greater potential to make progress than teaching that in various ways ignore the participants' background (reference to Paulo Freires pedagogy in Franker, 2004, p. 694).

## IDENTITY AND «INVESTMENT»

Possibilities to build on one's own experiences and resources can strengthen identity and contribute to *investment*, which means that the participant engages in and invests in learning.



*«The construct of investment offers a way to understand learners' variable desires to engage in social interaction and community practices» (Norton, 2013, p. 6).*

*«As the value of their cultural capital increases, so learners' sense of themselves and their desires for the future are reassessed» (Norton, 2013, p. 6).*



# LEARNING OBJECTIVES

The learning objectives for the project on which these guidelines are based are part of the pilot curriculum for language minorities – basic module for preparatory adult education, Chapter 4.2.4. NUMERACY AND MATHEMATICAL CONCEPTS (Kompetanse Norge, 2017). It states the following:

The learning objectives are that the participant should be able to

- count and use some pre-mathematical concepts in their mother tongue and Norwegian
- talk about different ways of counting that the participants have experience with
- explain in simple terms their experience of using everyday mathematics
- using the mathematical concepts 'greater than/less than', 'before/after', 'first/last', 'in front of/behind', 'most/fewest', 'is equal to, plus and minus'
- understand and show the connection between numerical symbols and amounts
- write, understand and count from zero to one hundred
- show that they understand the decimal system up to the hundred mark
- master addition and subtraction up to ten
- read and understand simple tables on paper and in digital format
- use the units kilograms, grams, metres, centimetres, litres and decilitres in practical situations
- name the geometrical shapes square, triangle and circle
- use calendars, dates, ordinal numbers, and tell the time in their daily routines
- use and check the right sums in purchases and sales under NOK 100
- talk about income, expenses and consumption in simple terms

# AN ECOLOGICAL/SOCIOCULTURAL VIEW ON LITERACY (BARTON, 2007)

- All participants carry with them their own numeracy story.
- All mathematics have a cultural history and are rooted in specific cultures and contexts (Bishop, 1988)
- All cultures produce mathematical ideas. We find six mathematical activities that are common across different cultures, even though they might look different (Bishop, 1988):
  - counting
  - measuring
  - locating
  - designing
  - playing
  - explaining

# UNIVERSAL MATHEMATICAL ACTIVITIES

- counting
- measuring
- locating
- designing
- playing
- explaining

Mathematical activities common across all cultures can form a basis for discussions of comparison:

*What is this like in your language  
and in your culture?*

# EXAMPLE FILM: PRONUNCIATION OF NUMBERS

«Uttale» (pronunciation)

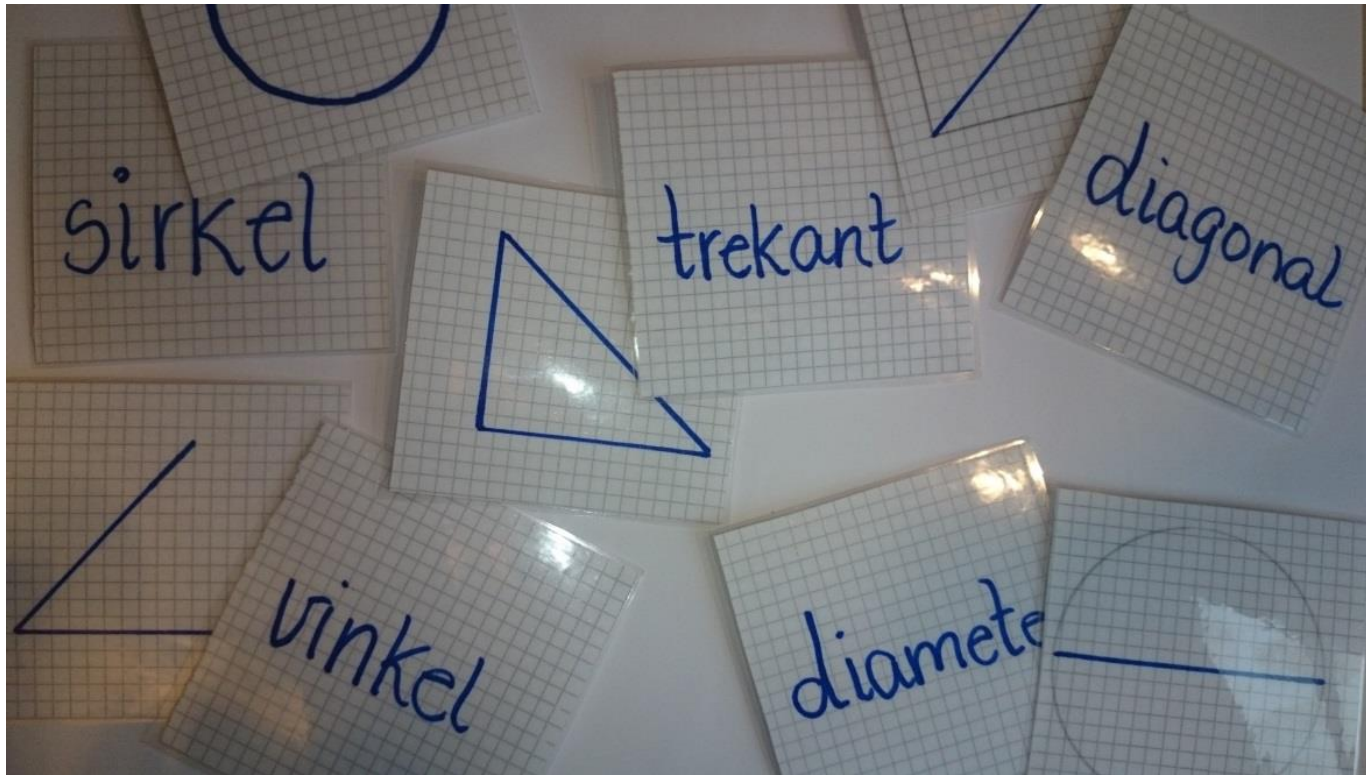
<https://www.kompetansenorge.no/Norsk-og-samfunnskunnskap/Methodisk-veiledning/metodisk-veiledning-basismatematikk-og-bruk-av-sprakhjelpere/>

# EXAMPLE FILM: *WORDS IN MATHEMATICS*

«Ord i matematikk» (words in mathematics)

<https://www.kompetansenorge.no/Norsk-og-samfunnskunnskap/Methodisk-veiledning/metodisk-veiledning-basismatematikk-og-bruk-av-sprakhjelpere/>

# GEOMETRICAL CONCEPTS



# IN EVERY TEACHING SESSION: DISCUSSING/CALCULATING USING EVERYDAY EXAMPLES



Linje	Destinasjon	Avgang	Info
170	Løten - Elverum	nå	
B1	Sanderud	18:20	
B1	Sanderud	18:48	
170	Løten - Elverum	19:03	
B1	Sanderud	19:18	
B1	Sanderud	19:48	
170	Løten - Elverum	20:03	
B1	Sanderud	20:18	
B1	Sanderud	20:48	
170	Løten - Elverum	21:03	



## EXAMPLE FILM: EVERYDAY MATHEMATICS - OFFERS

«Hverdagseksempel – Tilbud»

<https://www.kompetansenorge.no/Norsk-og-samfunnskunnskap/Methodisk-veiledning/metodisk-veiledning-basismatematikk-og-bruk-av-sprakhjelpere/>



# PROJECT IN 2017: SCHEDULE AND GROUPS

TID	TIRSDAG	ONSDAG
08.45-10.00	Opplæring/veiledning av språkhjelpere	Basismatematikk med språkhjelpere
10.15-11.15		Basismatematikk uten språkhjelpere

<b>LAND OG SPRÅK</b>	Somalia – somali	Eritrea – tigrinja	Syria – arabisk og kurdisk
<b>DELTAGERE</b>	Fire kvinner	To kvinner og to menn	To kvinner og to menn
<b>SPRÅKHJELPER</b>	Kvinnelig språkhjelper	Kvinnelig språkhjelper	Mannlig språkhjelper

# THE TEACHING – MAIN ELEMENTS

- Revision exercises
- The teacher introduces a new topic
- The group talks and discusses in their mother tongue and then in Norwegian with the whole class: What is this like in your language and in your culture compared to in Norwegian?
- Assignments, exercises, and games where the participants need to use new knowledge
- Everyday examples
- Evaluation

## EKSEMPEL PÅ «KAN-MÅL» FOR «TALL OG TELLING»

GRUPPE:	NAVNE:		
TALL OG TELLING			
	Utløker	Litt utløker	Kan
Kan telle rammen fra 1-100 på norsk			
Kan forklare forskjeller i tallsystemet på norsk og morsmålet <ul style="list-style-type: none"> <li>• 11-12 og 20</li> <li>• 11-19</li> <li>• 21-99</li> </ul>			
Er trygg på tallenes rekkefølge for eksempel <ul style="list-style-type: none"> <li>• Si tallet før og etter et tilfeldig tall mellom 1 og 100</li> <li>• Å telle nedover og oppover fra et tilfeldig tall mellom 0 og 100</li> </ul>			
Kan telle ti og ti			
Kan si adressen og telefonnummeret tydelig og riktig (to og to tall)			
Er trygg på riktig uttale av disse tallene: 3 – 13 – 30, 4 – 14 – 40, 6 – 16 – 60, 7 – 17 – 70, 8 – 18 – 80, 7 og 20			
Kjenner ordene for ti, hundre og tusen på morsmålet og norsk. Sies 10 000 og 100 000 på samme måte på norsk og morsmålene som er representert?			
Kan telle på norsk fra 100–9 999			
Har forståelse for systemet med enere, tiere og hundreere. Finner fram riktig sum penger og skriver riktig tall når de får høre et tall mellom 0 og 9 999.			
Vet hva partall og oddetall er.			
Vet hva desimaltall/kommatal er, og at det som er etter kommaet er det som er mindre enn 1			
Brøk: Vet hva $\frac{1}{4}$ , $\frac{1}{2}$ og $\frac{3}{4}$ betyr			
Desimaltall: Vet hva 0,25, 0,5 og 0,75 betyr			
Prosent: Vet hva 25 %, 50 % og 75% betyr			
Kan ordene tallene på norsk, og kunne forklare forskjeller på morsmålet og på norsk			
Kan si fødselsdato og dagens dato tydelig og riktig			

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