Jan 16, 2017

From: BARTEIT Lars, EDU/ECS
Sent: Montag, 16. Januar 2017 15:04
To: 'Zbimar'
Cc: TAGUMA Miho, EDU/ECS
Subject: Summary of the call on numeracy
Importance: High

Dear Zbigniew,

Thank you for taking the time to talk with us. As agreed I have summarized the call and attached some further information as well. Please note that those are internal working documents.

Please feel free to contact me, if any further information is needed or if we should clarify something.

Scope:

Number of pages 10 pages, excluding references and figures/tables

Deadlines:

First draft 15 February, the second draft 15 March after incorporating comments from OECD, the final draft 16 June after incorporating the comments from countries at the IWG meeting (16-18 May) or written comments after the meeting

To be discussed:

Please let us know, if you would be available for the time of the IWG meeting in Lisboa (Portugal) (16-18 May 2017).

Suggested structure of the paper:

I. Context / Drivers of Change
- What are the driving forces / major changes towards 2030 and why and how does numeracy remain important as part of the foundational competencies in these changing context?
  - Facing the post-factual area: prepare students to make them immune to lies
  - Rise of the AI: what is it that humans need to have?
  - Importance of data: collecting of more and more data, use of big data

Note: Please add any other contextual factors that you think are important to mention and link them to the importance of numeracy in 2030

II. Numeracy 2030:
- Will numeracy in 2030 mean the same? If not what would “numeracy 2030” look like?
- Will the expected level of numeracy in 2030 remain the same/ be different? Why?

Note: you mentioned “Smart calculations – let students wonder”. This can be elaborated.
  - Knowledge required for numeracy 2030:

        - Content knowledge (e.g. conceptual understanding/ key concepts/ big ideas) What kind of concepts are most relevant and needed? How to enable the students to use the "toolbox of math"? Implication for math classes
        - Procedural knowledge
        - Epistemic knowledge

      Note: for the definition of different type of knowledge please see: https://www.oecd.org/pisa/pisaproducts/Draft%20PISA%202015%20Science%20Framework%20.pdf

    - Skills required for numeracy 2030:
        - Cognitive and metacognitive skills – you mentioned "ability to reason/ mathematical reasoning for the future". Please add other constructs which you think would be key for numeracy in 2030
        - Social and emotional skills – you mentioned "emotional engagement", you could elaborate
        - Practical and physical skills – this category may not be applicable for "numeracy in 2030" but if you think certain aspects of numeracy would be developed inter-related with certain practical skills, please do mention.
    - Attitudes (and Values) required for numeracy 2030:

    Note: You mentioned the following but not limited to what we discussed. Please add other examples upon your reflection. E.g. attitude of students towards new things, free of anxiety about numbers, motivation

    Note: for the taxonomy we use for skills and attitudes above, please refer to our draft conceptual framework for competencies.

III. Transferability
- How will numeracy 2030 (knowledge, skills and attitudes) be transferable to other disciplines? How can math classes connect to other subjects and make interdisciplinary teaching more easy?

IV. Measurability
- How can the knowledge, skills and attitudes required for numeracy 2030 be measured? If not, which of the aspects are difficult to measure and what are emerging attempts to measure these?

V. Sequencing
- Are there any particular sequencing of topics/ skills/ attitudes for numeracy in 2030 that would be more effectively learnt? If yes, what would be the effective sequencing of learning to build numeracy 2030?
- What opportunities and risks do you see with freely available, self-directed learning resources (e.g. Khan Academy)? Would it allow students to learn more effective given that each student has different level of prior knowledge/ skills/ attitudes to build on further their numeracy 2030?

VI. Beyond 2030 (please feel free to explore questions thinking out-of-the box: "food for thoughts"
- How will AI change the world and thus change the required level and scope of numeracy in 2070?
- Other questions of your choice