Multilingualism and Multidisciplinarity as Pathways to an inclusive Knowledge Society …

the point of view of a representative of “hard” sciences

…
“All European countries are now experiencing a sharp increase in language diversity, which brings both threats and opportunities.

They are seeing a decline in literacy and high-level language skills in any language among their citizens.

And in higher education, the rapid growth of internationalization is transforming education and research.”
Context: ELC/CEL policy statement, December 2014 (2)

- The CEL/ELC recognizes the importance of languages in the new economic and political situation...

- ... does not believe that increased use of English will meet more than a limited range of needs, and it is concerned that a reliance on English will leave European citizens seriously disadvantaged in working and living in the new international environment.
“The Two Cultures”
Charles Percey Snow, 1959

https://www.scientificamerican.com/article/an-update-on-cp-snows-two-cultures/
“A good many times I have been present at gatherings of highly educated people who have with considerable gusto been expressing their incredulity at the illiteracy of scientists.

Once or twice I have asked the company how many of them could describe the Second Law of Thermodynamics. The response was cold: it was also negative. Yet I was asking something which is the scientific equivalent of: Have you read a work of Shakespeare’s?”
1. What is a knowledge society?
2. What is the meaning of multilingualism for the “hard” sciences, the so-called STEMM* disciplines?
3. How is it related to multidisciplinarity and to the Grand Challenges for our planet and mankind, Europe and our societies?
4. Should we consider the existence of English as a lingua franca a curse or a blessing?

*STEMM stands for Science, Technology, Engineering, Mathematics, Medicine.
1. What do we mean by a “Knowledge Society”?

“A knowledge society generates, processes, shares and makes available to all members of the society, knowledge that may be used to improve the human condition.”

Definition provided by the 2005 UNESCO World Summit
A Knowledge Society (2)

- A Knowledge Society is a society in which intellectual and technical knowledge is valued as the primordial asset.

- A knowledge society highly respects and valorizes man and women researchers, discoverers, inventors, innovators, artists.

- And the scholars, persons of high literary or scientific attainments. Colleagues like you!
... also highly values the people who transmit that knowledge, professors, teachers, educators, technicians, science communicators, and science journalists.

It is of course sustained by a knowledge based and innovation driven economy, but should not be identified with it.

An ideal KS can only be established and maintained in a democracy.
Communication between peers (and often competitors!) has always been essential for scientific and technical progress.

This communication often needed (and still needs) the support of “translators”, *multilingual experts / scholars in the field.*
One example:

the crucial role of H.A LORENTZ, chair of the very first Solvay Council in Physics, Hotel Métropole, Brussels, October 1911 and all the ones that followed up to 1930…

…at the cradle of Quantum Physics

The very first Solvay Conference in Brussels, October 1911
Multilingualism in Science (2): beyond the languages spoken in the world.

“A language is an evolving system of linguistic, vocal, graphic or gestural signs, which allows communication between individuals”

Key properties: Symbolic- Semantic- Generative- Structured- Syntactic.

“Les Philosophes s’expriment avec plaisir dans une langue obscure réservée aux initiés”
(Jean-François Revel, Histoire de la philosophie occidentale, 1994, NiL ed)

The same is true for STEMM experts.
What is Physics?

It is a *language* developed by humans that allows - with the help of increasingly sophisticated instrumentation - *for a dialogue with Nature.*
Physics is a Tower of Babel of languages, “paradigms”.

Irina Veretennicoff – Contribution to the 2016 ECL-CEL Forum, December 1st 2016
Multilingualism in Physics often leads to unexpected results. **Example:** blending tools of general relativity.
At the heart of traditional physics: the index of refraction!

\[ n_1 \sin \alpha = n_2 \sin \beta \]
...and the physics of the fata morgana’s
Has led to a new language (concepts and tools) for the design of extraordinary objects like invisibility cloaks and much more.

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\frac{1}{\sqrt{g}} \frac{\partial \left( \sqrt{g} g^{ij} \varepsilon_0 E_j \right)}{\partial x^i} = 0
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\frac{1}{\sqrt{g}} \frac{\partial \left( \sqrt{g} g^{ij} \mu_0 H_j \right)}{\partial x^i} = 0
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Beyond the individual already multilingual STEMM disciplines,

we witness today the emergence of a new STEMM paradigm, where “S” stands for all sciences,

including social sciences, health sciences, cognitive sciences, linguistics, history, political sciences etc.
MULTI –and METADISCIPLINARITY to address the seven “Grand Challenges”

- Food security, sustainable agriculture and forestry, marine and maritime and inland water research and the bioeconomy
- Health, demographic change and wellbeing
- Secure, clean and efficient energy
- Smart, green and integrated transport
- Climate action, environment, resource efficiency and raw materials
- Europe in a changing world - inclusive, innovative and reflective societies
- Secure societies - protecting freedom and security of Europe and its citizens.

Irina Veretennicoff – Contribution to the 2016 ECL-CEL Forum, December 1st 2016
4. The use of English: a curse or a blessing?

*It is a blessing, because it corresponds to a necessity!*

- Multi- and metadisciplinarity in STEMM - and beyond - require the use of one concise and simple spoken lingua franca.

- It is needed for efficient communication between peers within that super Tower of Babel of disciplines.

- So far “English” seems to be the only candidate.

- That “English” is some kind of new Esperanto, not really the language spoken by the native UK or US scholars (a curse for them?)
But all vernacular languages of the world are essential too!

- A modern, inclusive knowledge society requires a large “constituency” (a group of people who support or are likely to support...) for all sciences, arts, and technologies.

- Citizen science and cultural projects of all kinds, contextualized STEAMM education are of utmost importance to reach that objective.

- Only the use of the local vernacular languages can reach and captivate all layers of the population.
Conclusion

- We agree with the CEL/ELC, who recognizes the importance of languages in the new economic and political situation...

- We believe that increased use of English will undoubtedly meet a large range of needs. Reliance on English and other languages (Madarin Chinese, Spanish, Portuguese, Russian, Japanese, ...) will seriously advantage European citizens in working and living in the new international environment.
Many thanks for your kind attention!

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