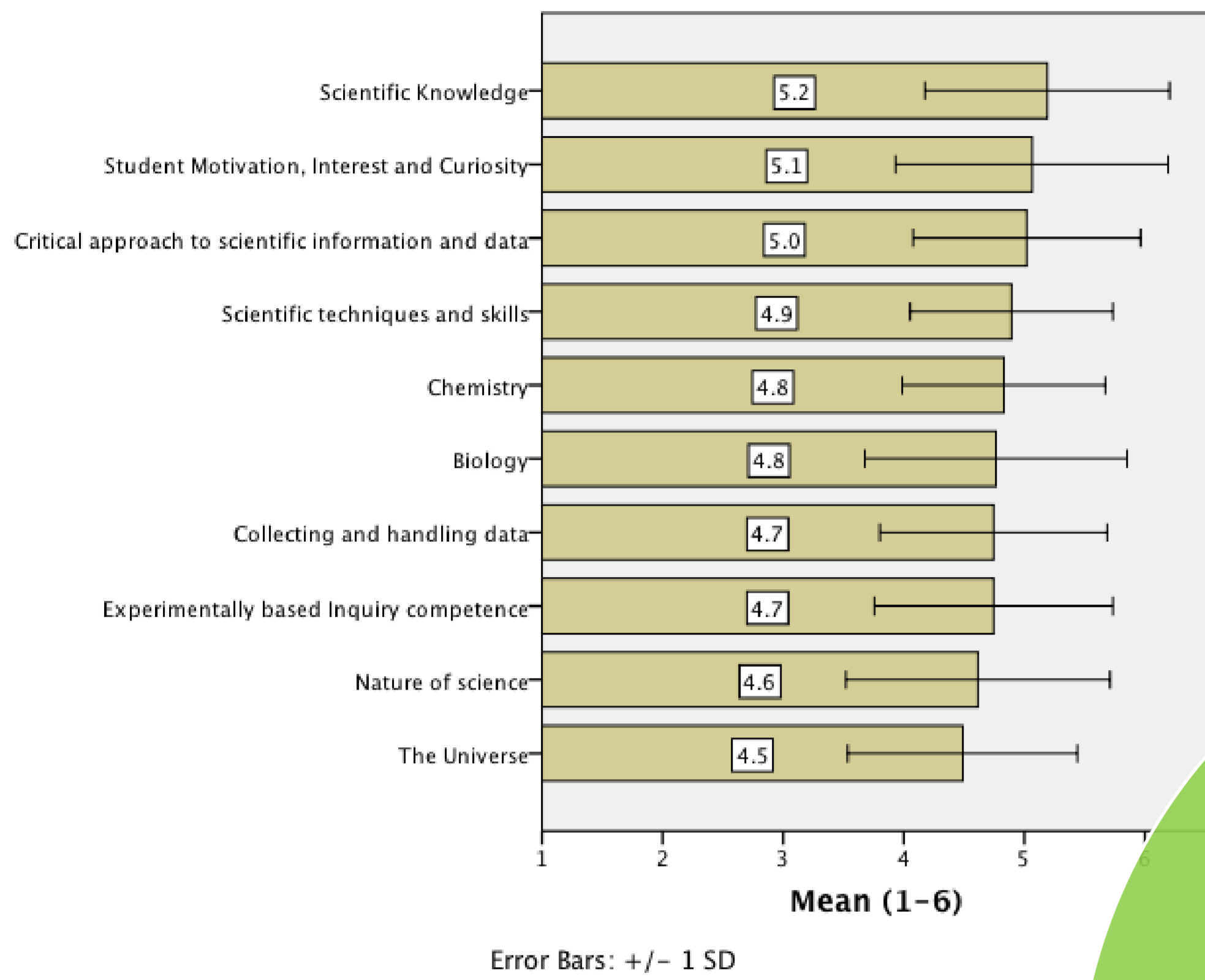


Doing IBSE in Denmark



	Students	Science teachers	Industry/scientists	Scientific education researchers/ admin.	Total
1 Round					
# invitees	184 +	274 +	172	64	
2 Round					
# invitees	126	55	17	22	220
# respondents	12	38	8	11	69
%	10%	69%	47%	50%	31%



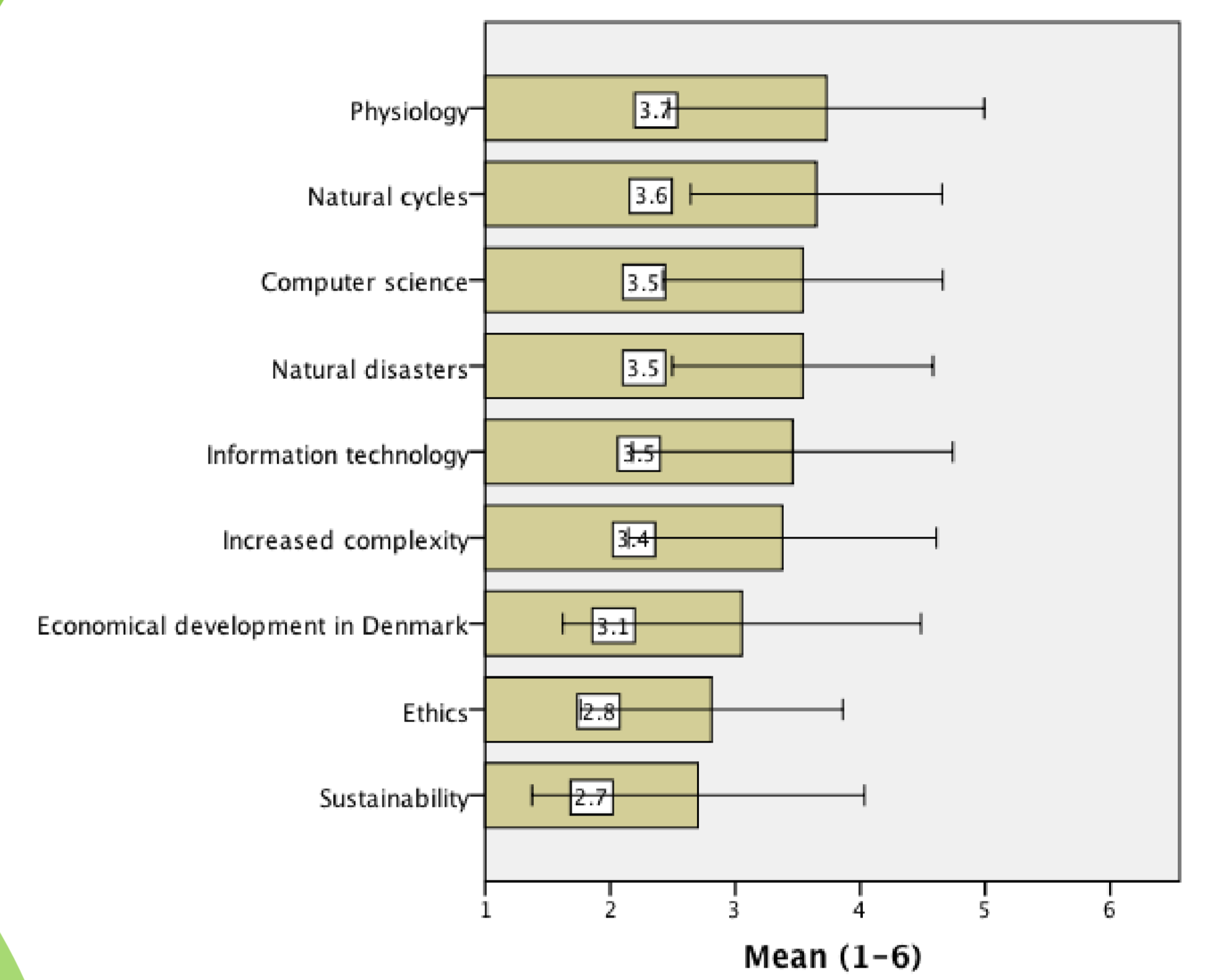
Top ten categories rated in the 2nd round of the Delphi study; ideal teaching in science. Danish upper secondary schools (grade 10-12).



-> more focus on the skills and competences related to IBSE

-> just having a socio-scientific focus does not ensure students engagement

Experiences from Science teacher courses



Bottom ten categories rated by the stakeholders; 2nd round of the Delphi study; ideal teaching in science. Danish upper secondary schools (grade 10-12).

Teacher experiences

Problems

- Science is more than just inquiry.
- Very time consuming and takes time from other ways of teaching.
- Some topics in science are impossible for students to do experiments on.
- For some teachers it is hard to allow the students to take the lead.

Challenges

- "Engage" is hard.
- IBSE is hard for the students.
- Students need to learn to do IBSE.
- 5E and IBSE has a build in dilemma. To be successful IBSE requires to be practiced over and over again.

Advantages

- IBSE is allowing for a differentiated teaching environment.
- Students develops additional skills.
- IBSE is not just about making experiments. It allows for a great deal of flexibility.
- IBSE does not mean that you as a teacher are not allowed to teach the students.
- Students are more willing to share their findings.

Keys to success

- Teaching based on the IBSE approach often requires skills and knowledge on multidisciplinary subjects. Most teachers do not possess this knowledge. This challenge can be supported by setting up fora for teachers to exchange ideas, discuss problems, ask for help etc.
- Make sure that your focus on innovation and entrepreneurship goes hand in hand with your focus on IBSE.
- Obstructions may be one way to steer the students in the right direction or to rethink their experiments or their findings.
- "Traditional" problem and project based learning has the focus mostly on the role of the students. The 5E focusses on the role of the teacher. Not letting the students alone with their challenges but is setting up a scenario for the guidance to take place in each step of the model.
- If the students are not engaged the IBSE setup will die. The Engage phase is essential.

