

Exploring the uses of ICT in education: A national survey study

Robert A.P. REUTER¹, Gilbert BUSANA¹ & Serge LINCKELS²

¹Université du Luxembourg

²Ministère de l'Education nationale, de l'Enfance et de la Jeunesse



@bobreuter // #edtechlu

Challenges of the Digital Era for Education, Learning and Working:
Researchers and Practitioners in Dialogue



Presentation plan

- **Context: educational policy “*Digital(4)Education*”**
- **Practical & theoretical foundations**
- **Research goals**
- **Research method**
- **Results**
- **Conclusions**
- **Implications**
- **Discussion**

■ Digital(4)Education: policy, strategy & measures

Présentation



Préparer efficacement l'école aux défis du 21^e siècle signifie aussi relever le défi des technologies de l'information et de la communication. Pour des raisons d'équité des chances, l'Éducation nationale doit d'une part permettre à tous les élèves d'accéder aux TIC ; elle doit d'autre part tirer pleinement profit du potentiel du numérique pour s'adapter aux besoins différents de chaque élève. Dans ce domaine, les compétences clés sont la communication, la documentation, la collaboration, la créativité et l'esprit critique.

Comment préparer les jeunes aujourd'hui à un marché du travail qui aura considérablement évolué demain ? Une chose est certaine, le numérique y jouera un rôle décisif. Il faut donc apprendre aux élèves à utiliser les TIC, et le recours à celles-ci doit également être entré dans les programmes scolaires. Afin de préparer la nouvelle génération

à son avenir, le ministère a conçu une stratégie globale, déclinée en plusieurs dimensions clés et qui inclut éducation formelle et non-formelle. Elle a été présentée au printemps 2015.

<http://zukunft.men.lu/fr/grands-projets/digital-4-education>

- **Digital(4)Education: policy, strategy & measures**

*La stratégie Digital (4) Education vise notamment à amener les élèves à développer les **compétences** nécessaires à une **utilisation adéquate et responsable des TIC** et à promouvoir des **projets pédagogiques innovants** utilisant le numérique à l'école. (Bertemes, 2015, emphases added)*

<https://prezi.com/u537jjw7wpza/presentation-de-la-strategie-digital-4-education/>

Educational challenges



- Give **all students** an **equal access** to ICT tools
- Use the potential of ICT to address the **different needs** of students

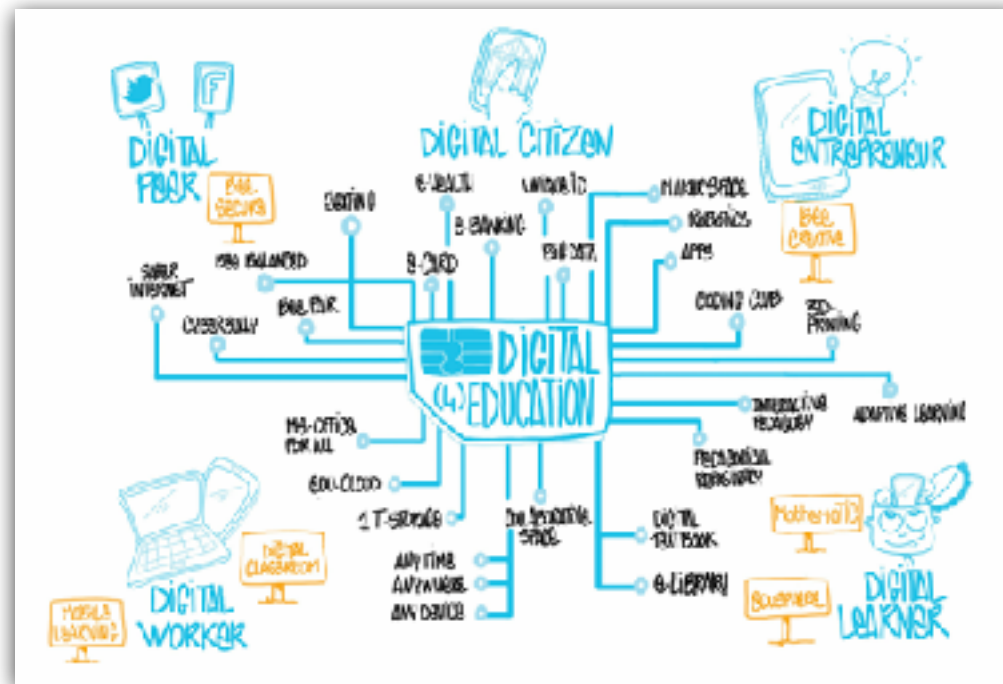


- **Promote** the use of ICT in education (formal & non-formal)
- Integrate **ICT-related skills** into the **curriculum**



- Contribute to a **national effort**
- **Adapt** the education system to the demands of the labor market

■ Digital(4)Education: policy, strategy & measures



(Bertemes, 2015)

<https://prezi.com/u537jjw7wpza/presentation-de-la-strategie-digital-4-education/>

- **Digital Lëtzebuerg**
 - General political efforts to promote meaningful, responsible & relevant uses of ICT in the general population
 - High penetration of mobile ICT devices
 - High connectivity rate of ICT
 - But average ICT competencies
 - Lack of highly-qualified IT-skilled workforces

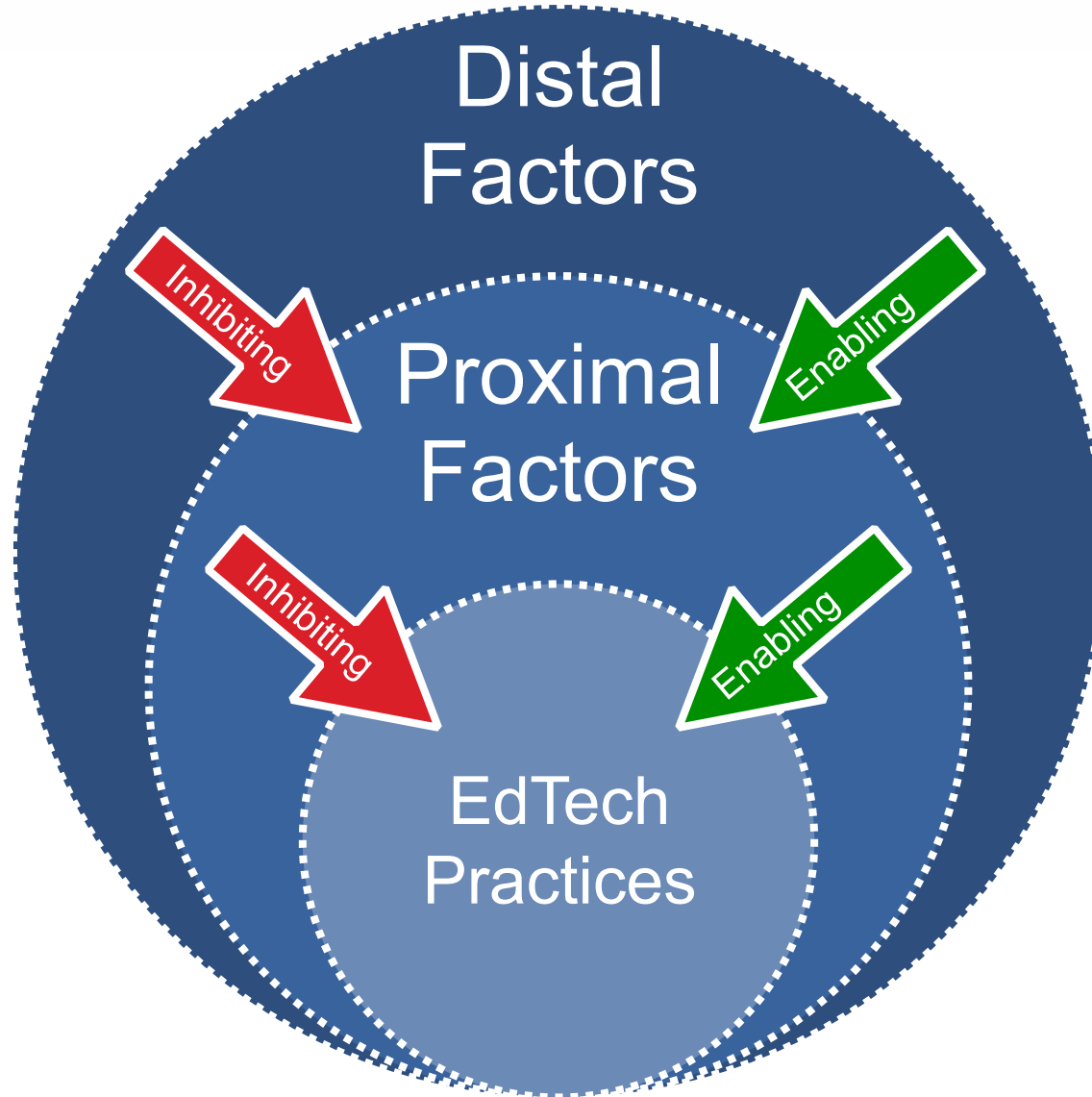
- Determine current (mid-2015) educational technology practices in Luxembourg, given the start of the *Digital(4)Education* strategy in September 2015
- Assess impact of policy-motivated actions on educational technology practices
- Comparison with national survey from 2009
- Inform *Digital(4)Education* measures to be taken
- Recommendations for initial & continuous teacher training

Theoretical foundations



- Part of a **larger research project** about educational technology policies, strategies, theories and practices in Luxembourg: past, present & future - www.edtech.lu
- **Educational technology practices**: supporting, enriching, modifying & transforming **learning & teaching activities with** digital media & tools; fostering **ICT literacy** in students (Tools for Learning & Content of Learning)
- Understand practices in terms of known **influence factors**: proximal/ internal and distal/external (Ertmer, 1999; Tondeur, Hermans, Valcke & van Braak, 2008; Busana, 2001)
- Understand the current **educational ecosystem** (Zhao & Frank, 2003) in terms of **hindering and enabling factors** (Pelgrum, 2001; Tondeur, Valcke, & van Braak, 2008; ISTE “essential conditions”, 2009)

Model



Research goals

- Establish theory-based overview of current uses of ICT education (K-12+) at a national level
 - Technology integration strategies: directed instruction vs. inquiry-based learning (Roblyer & Doering, 2013)
 - Types of learning & teaching activities (Leclercq & Poumay, 2005)
 - Functions of ICT for student-centred learning (Busana, 2001)
 - Learning goals of ICT-supported teaching (Anderson & Kratwohl, 2001)
 - Hardware tools used in classrooms by teachers // students
 - ICT uses beyond the classroom: course preparation, student evaluation and administrative tasks
 - ICT literacy as content of student learning

Research goals

- **Understand the national educational ecosystem (Zhao & Frank, 2003), in terms of proximal and distal factors, as a more or less favourable breeding-ground for EdTech practices (ISTE, 2009):**
 - Initial & continuous EdTech teacher training
 - (Self-declared) digital skills of teachers
 - Private uses of ICT by teachers
 - Pedagogical and techno-pedagogical beliefs and attitudes of teachers
 - (Perceived) school cultures
 - ICT infrastructures
 - (Perceived) national educational technology policies & strategies

- **Large-scale study: big picture approach**
- **Online survey, with mostly closed multiple choice questions**
- **Distributed to all teachers in public schools (K-12+); population = 10.796, K-6: 5.614, 7-12+: 4.670, SN: 512**
- **24/06 - 15/07/2015: towards the end of the school year**
- **Collaboration between University and 2 departments of the Ministry of Education (SCRIPT-INNO & SCRIPT-ADQS)**

- **Questions about general demographic variables: age, work experience, gender, grades taught, municipality, discipline(s) taught**
- **Questions regrouped by dimensions of the theoretical model: proximal factors, distal factors, EdTech practices (administrative tasks, course preparations, teaching in the classroom, learning in the classroom, student evaluations)**

Proximal factors

Personal data

Competencies:
Use of ICT
Teaching with ICT

Private Use of ICT

Pedagogical &
Techno-pedagogical
convictions

Distal factors

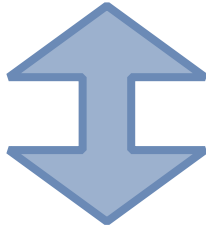
School culture
context

ICT infrastructure in
school

National Digital
Education Policy

EdTech practices

Teacher-centred: Instruction



Learner-centred: Inquiry-based

Course preparation

In the classroom

Evaluation

Administratives tasks

Hardware used

Software used

ICT as a content of learning

ICT as a tool
for learning & teaching

EdTech practices

Taxonomy of
Learning & Teaching events
(Leclercq & Poumay, 2005)

Functions of ICT for inquiry learning
(Busana, 2001)

Bloom's taxonomy of learning
objectives (Anderson & Kratwohl,
2001)

Hardware used
Software used

Course preparation

In the classroom

Evaluation

Administratives tasks

ICT as a content of learning

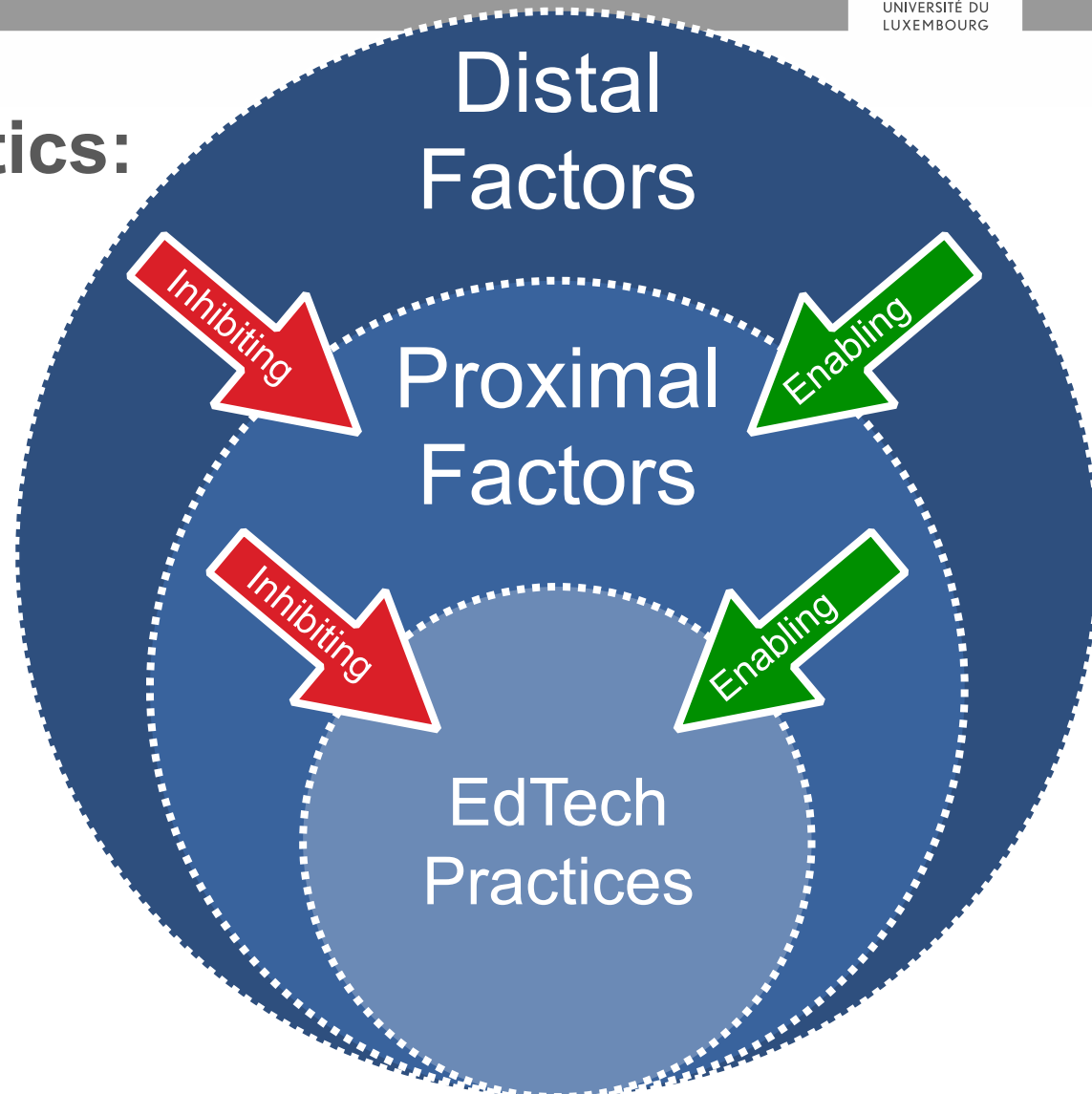
ICT as a tool
for learning & teaching

- **Scales used:**
 - **strongly disagree, don't agree, neutral, agree, strongly agree**
 - **never, once per trimester, once a month, once a week, at least once a day**
 - **none, 1, 2-5, 6-10, 11-19, 20+**
 - **no clue, beginner, average, advanced, expert**
 - **names of municipalities, grades, male/female**

Results

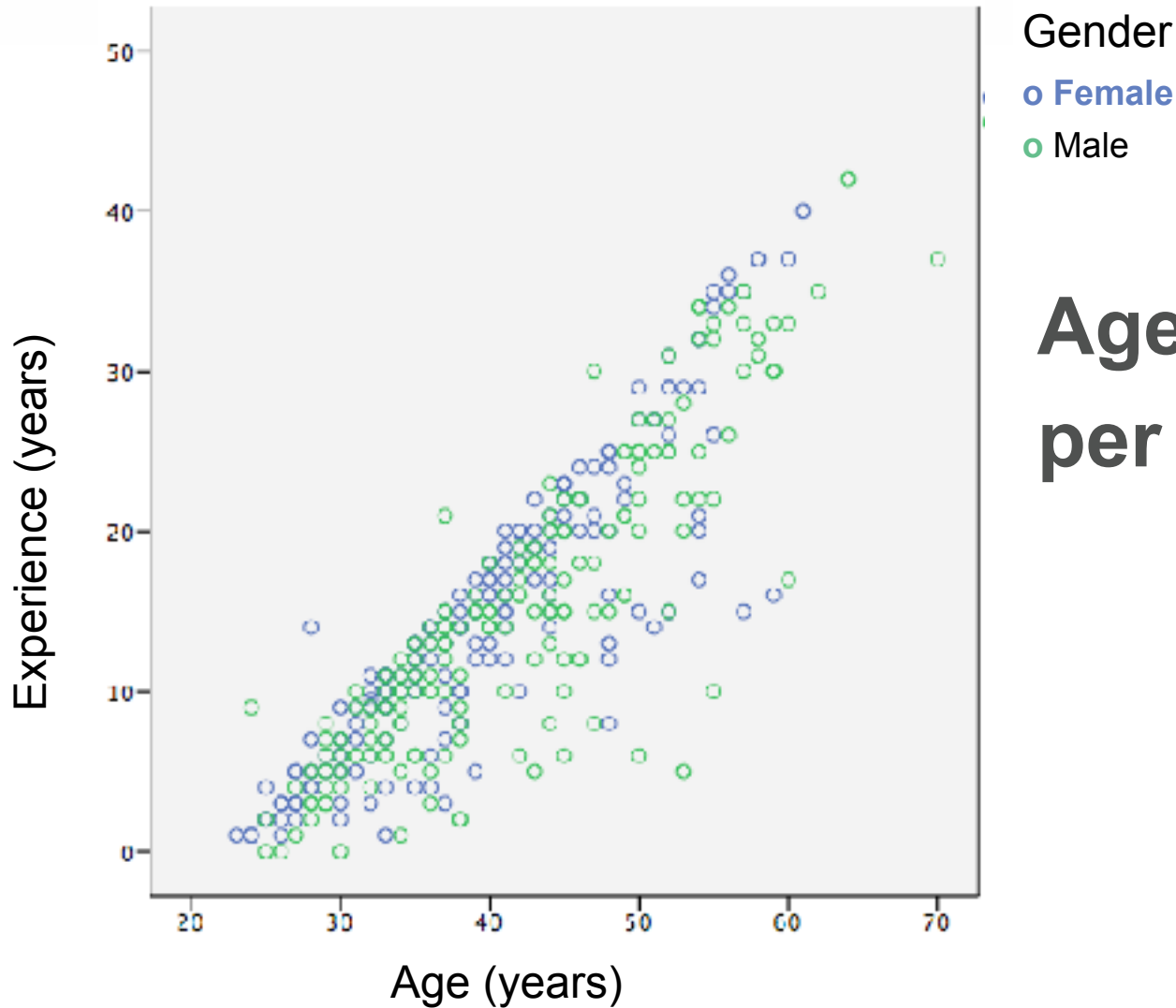
Descriptive statistics:

- ▶ Demographic data
- ▶ Distal factors
- ▶ Proximal factors
- ▶ EdTech Practices



- **General demographic data**
 - **Sample: n=408**
 - **Gender: 54.4% F, 45.6% M (n= 399)**
 - **Age: average 41 years, range 23-70 years (n=402)**
 - **Experience: average 15 years, range 0-42 years (n=400)**

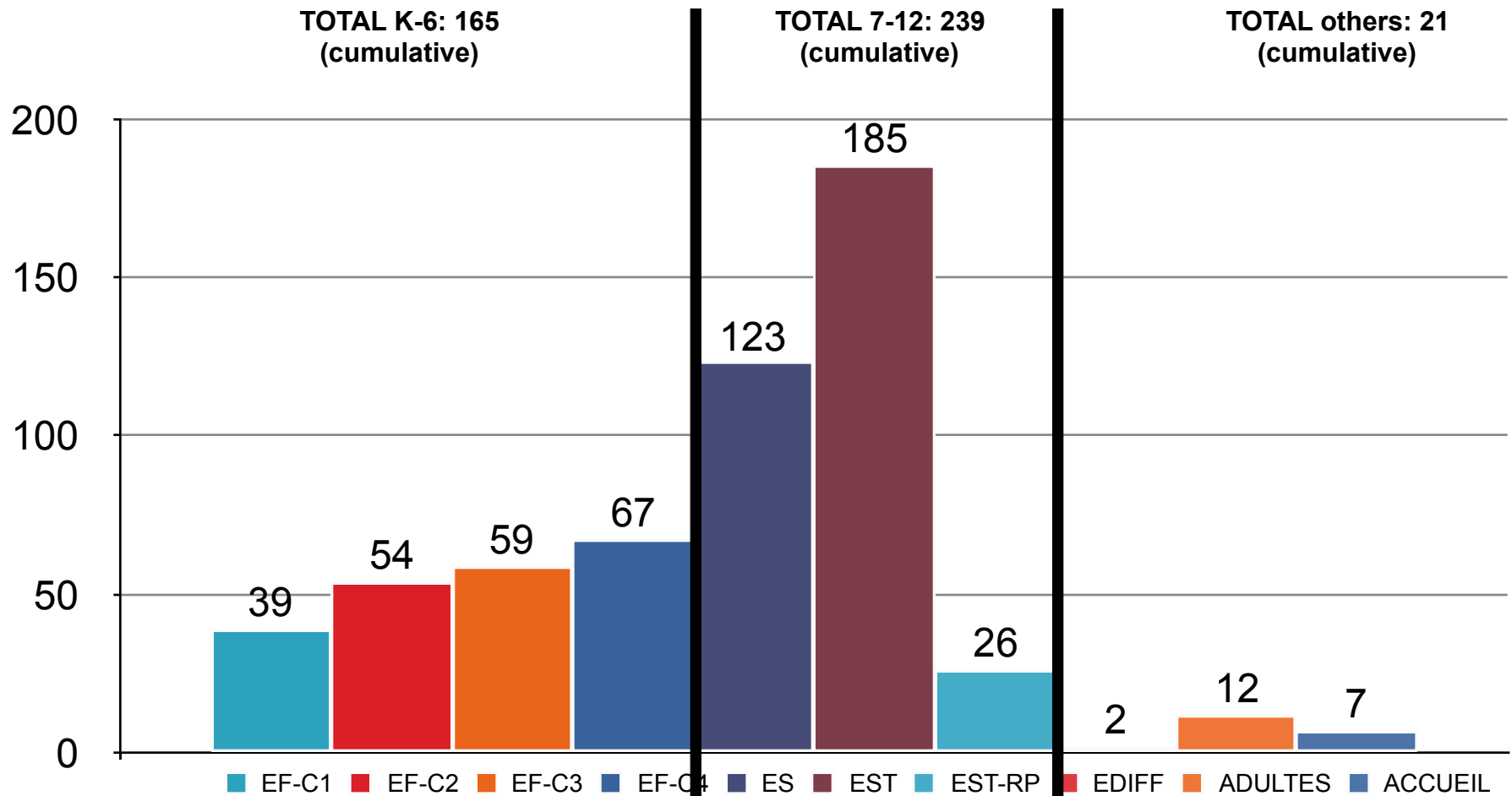
Results



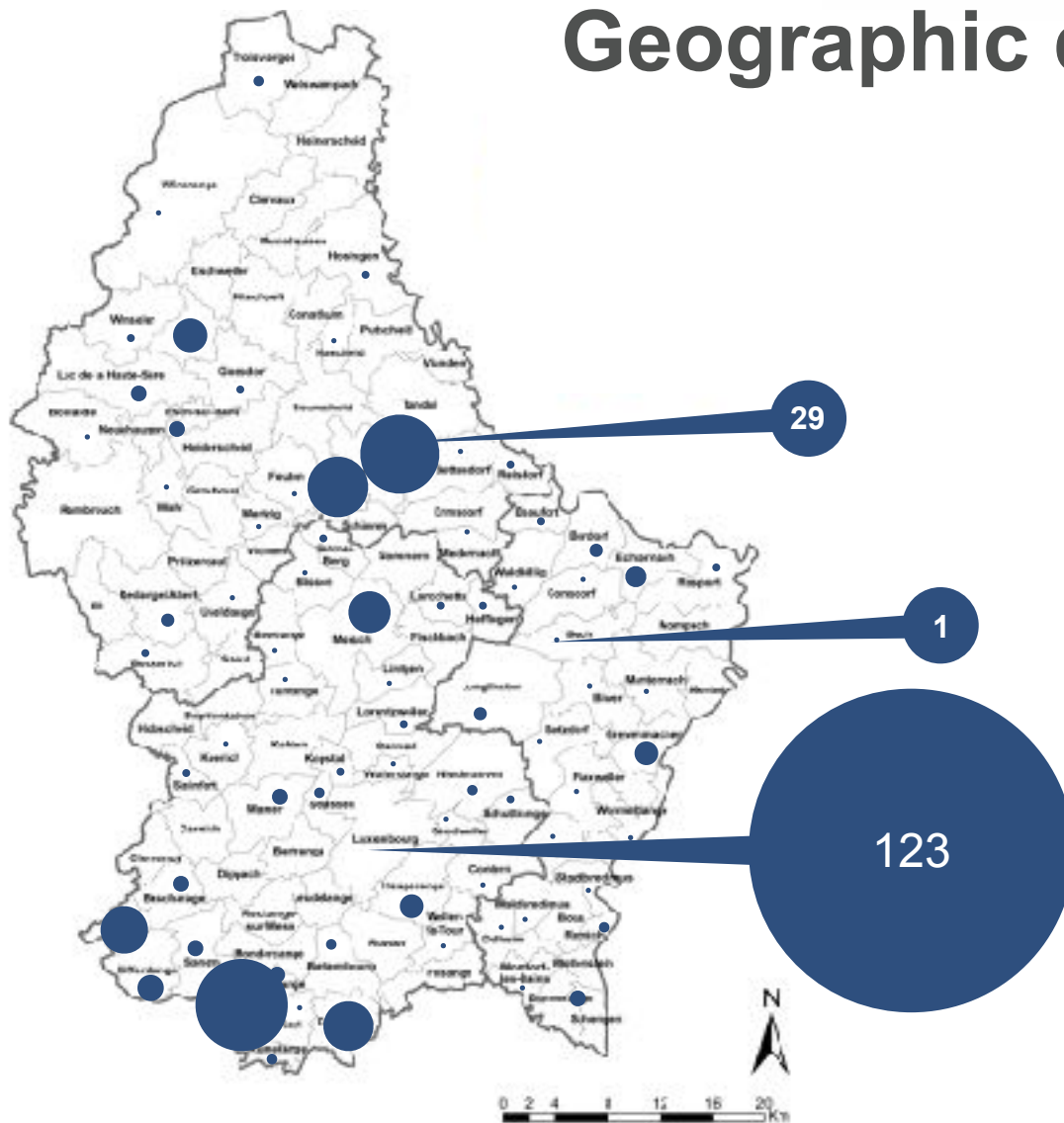
Age x Experience per Gender

Results

Distribution per grades



Geographic distribution



Distal factors

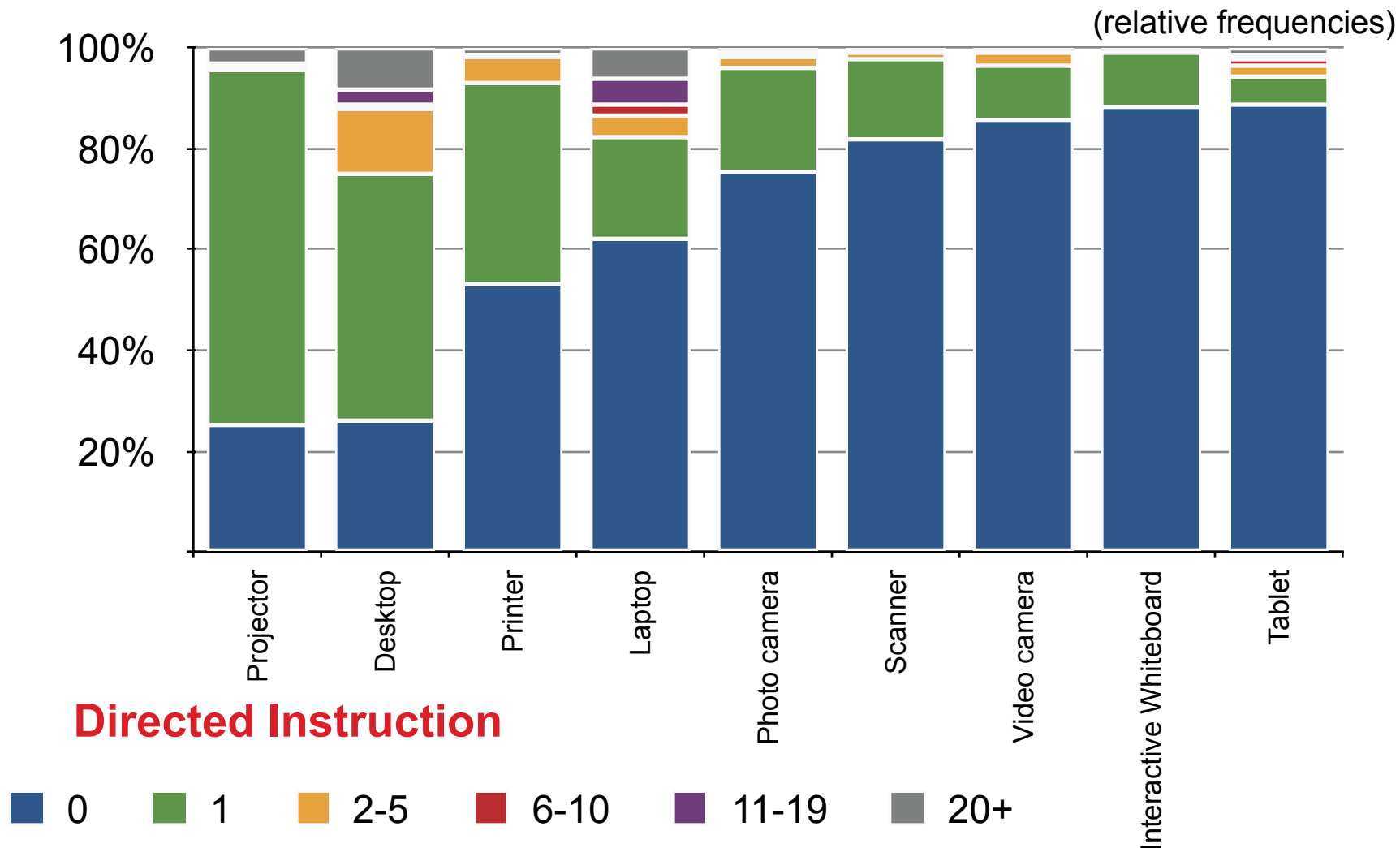
School culture

ICT infrastructure in
schools

National Digital
Education Policy

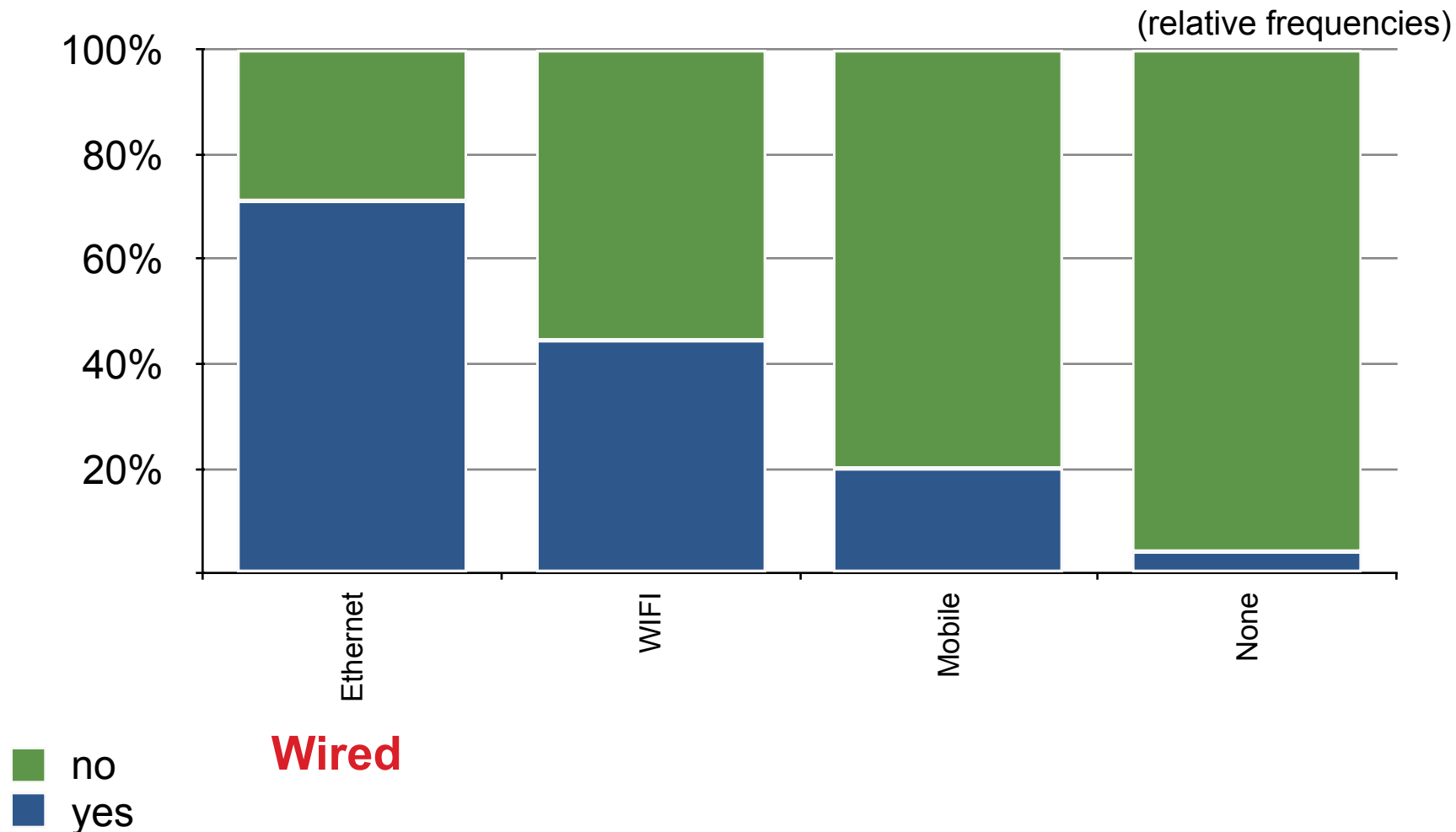
Results

ICT Infrastructure: Hardware



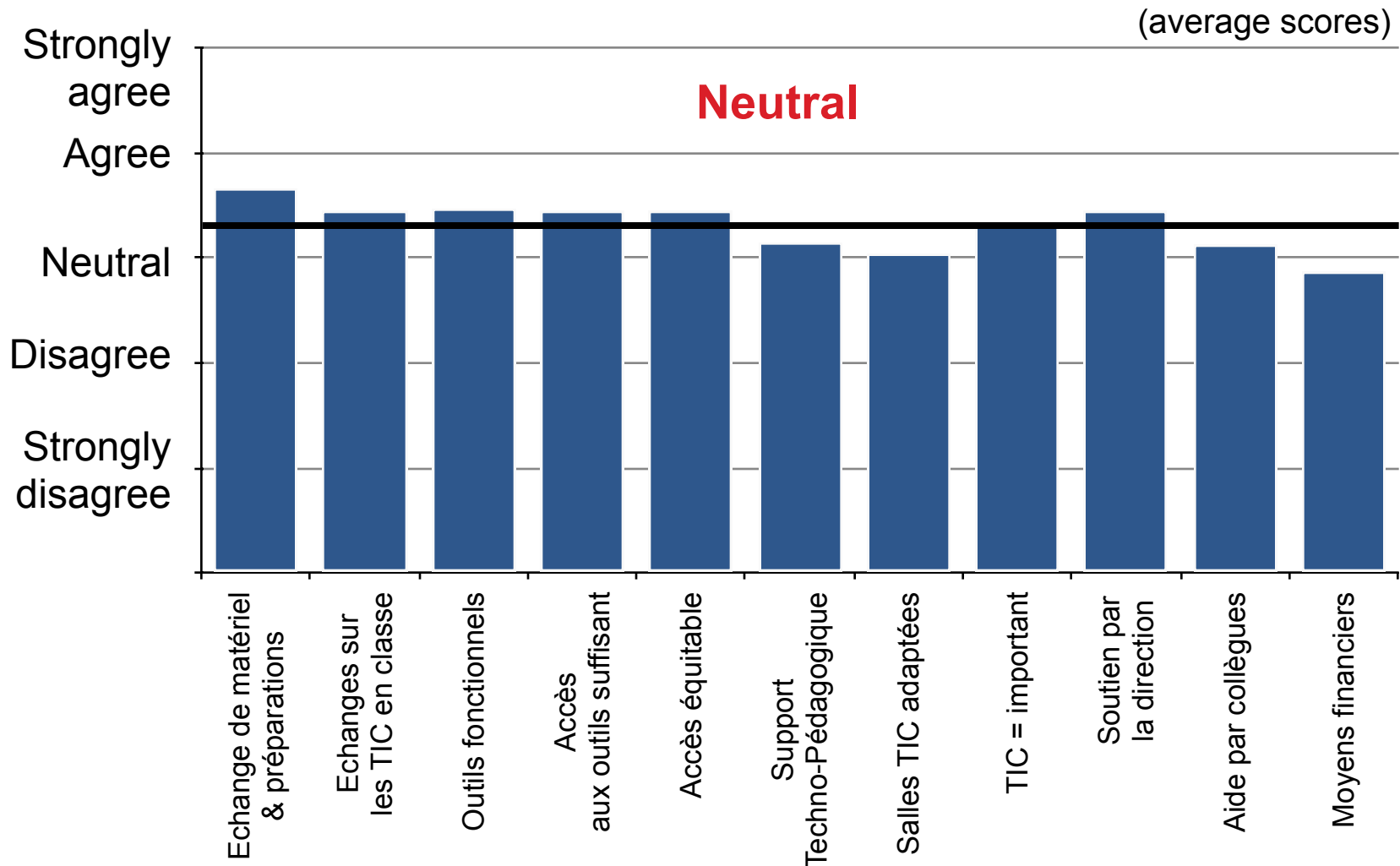
Results

ICT Infrastructure: Internet access

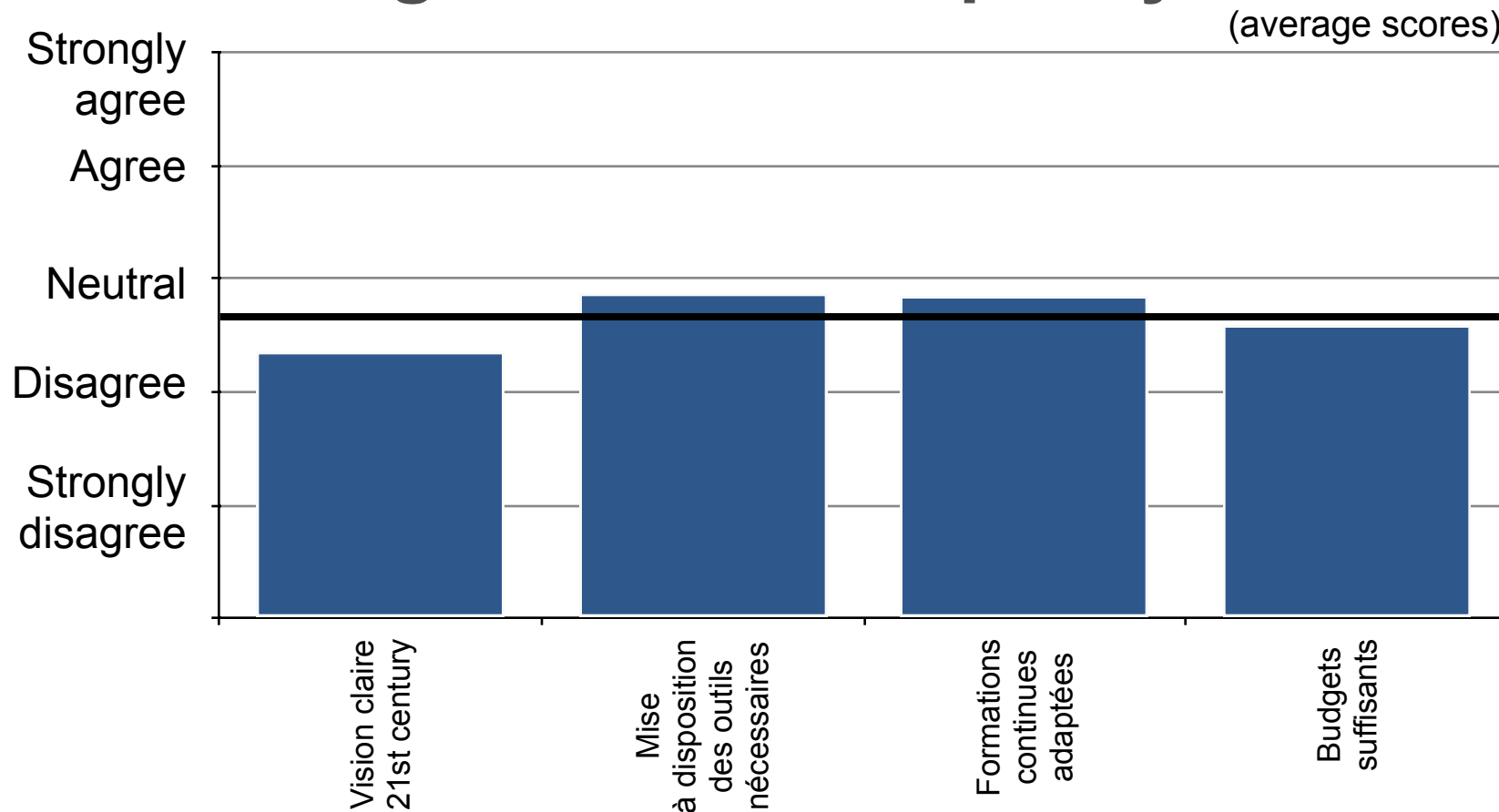


Results

School culture



National digital education policy



Proximal factors

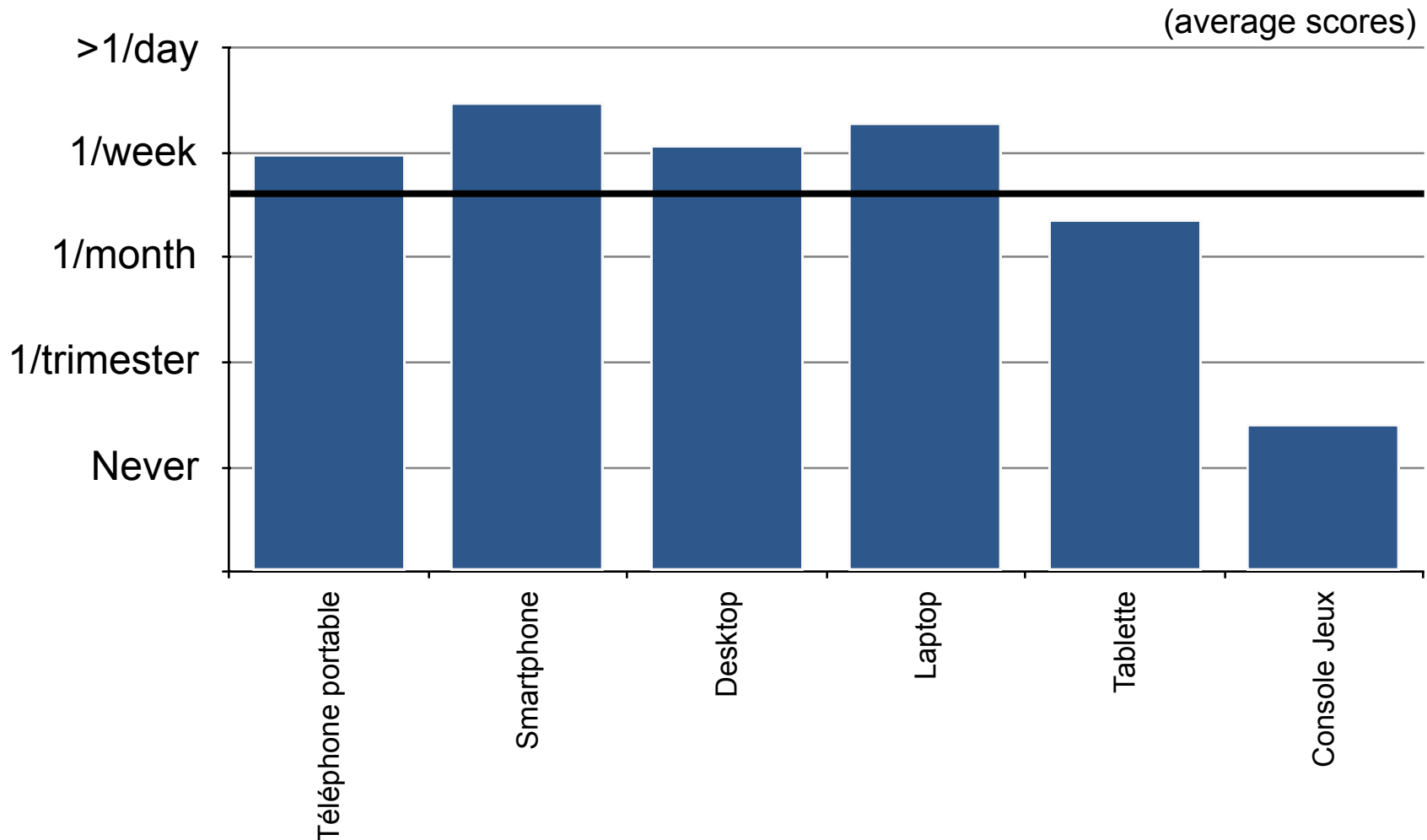
Personal data

Competencies:
Use of ICT
Teaching with ICT

Private Use of ICT

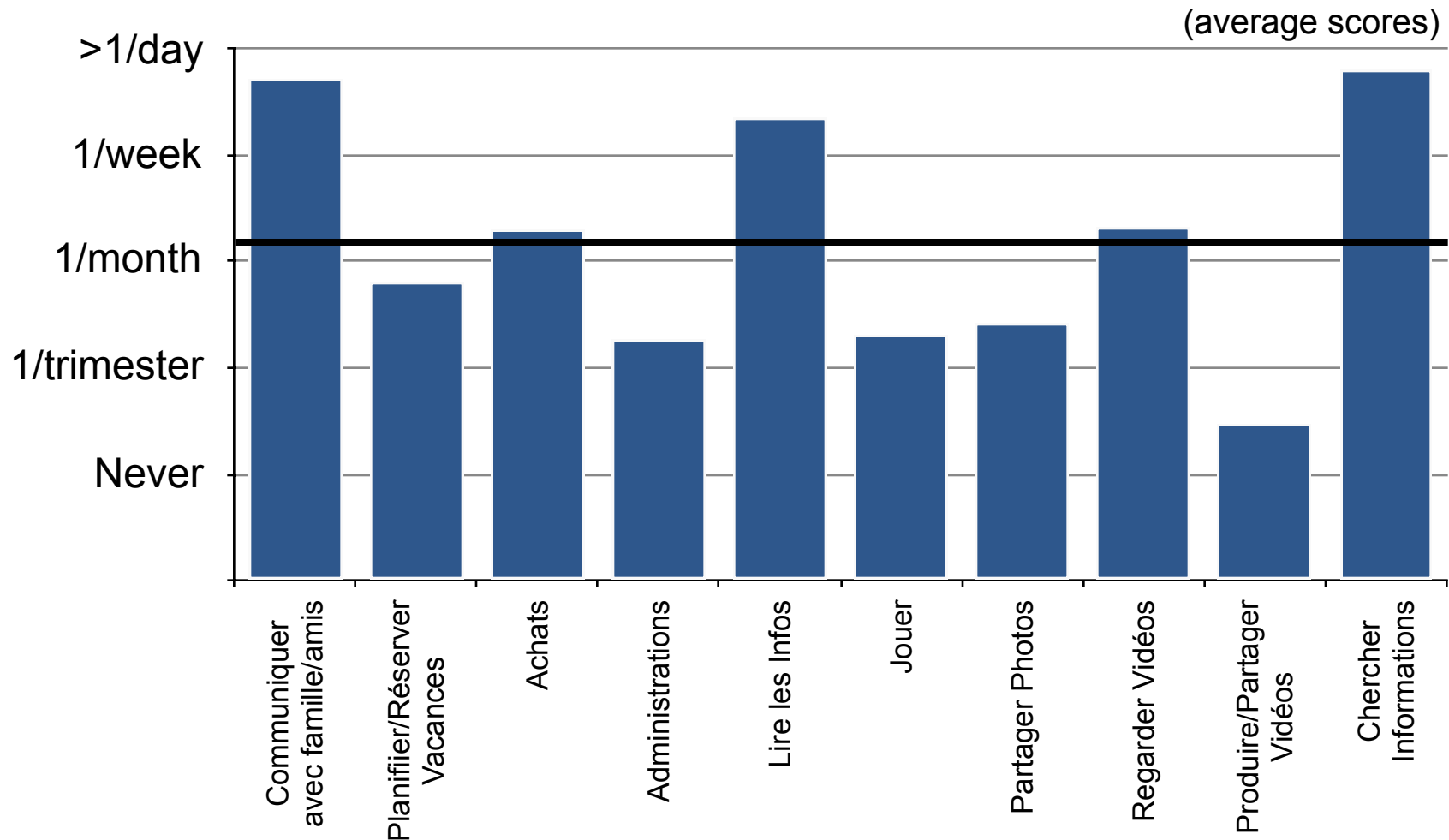
Pedagogical &
Techno-pedagogical
beliefs

Private use of ICT: hardware

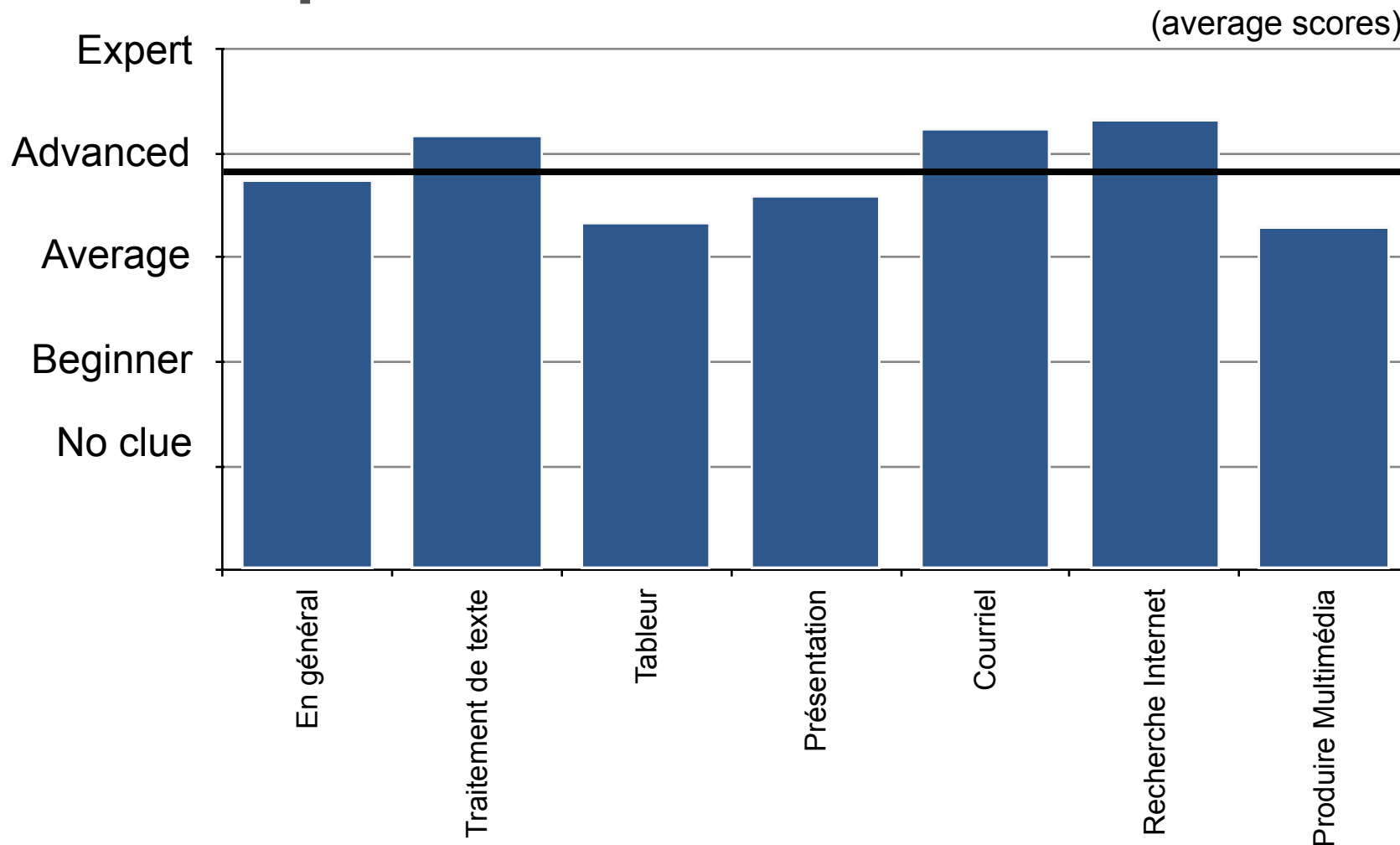


Results

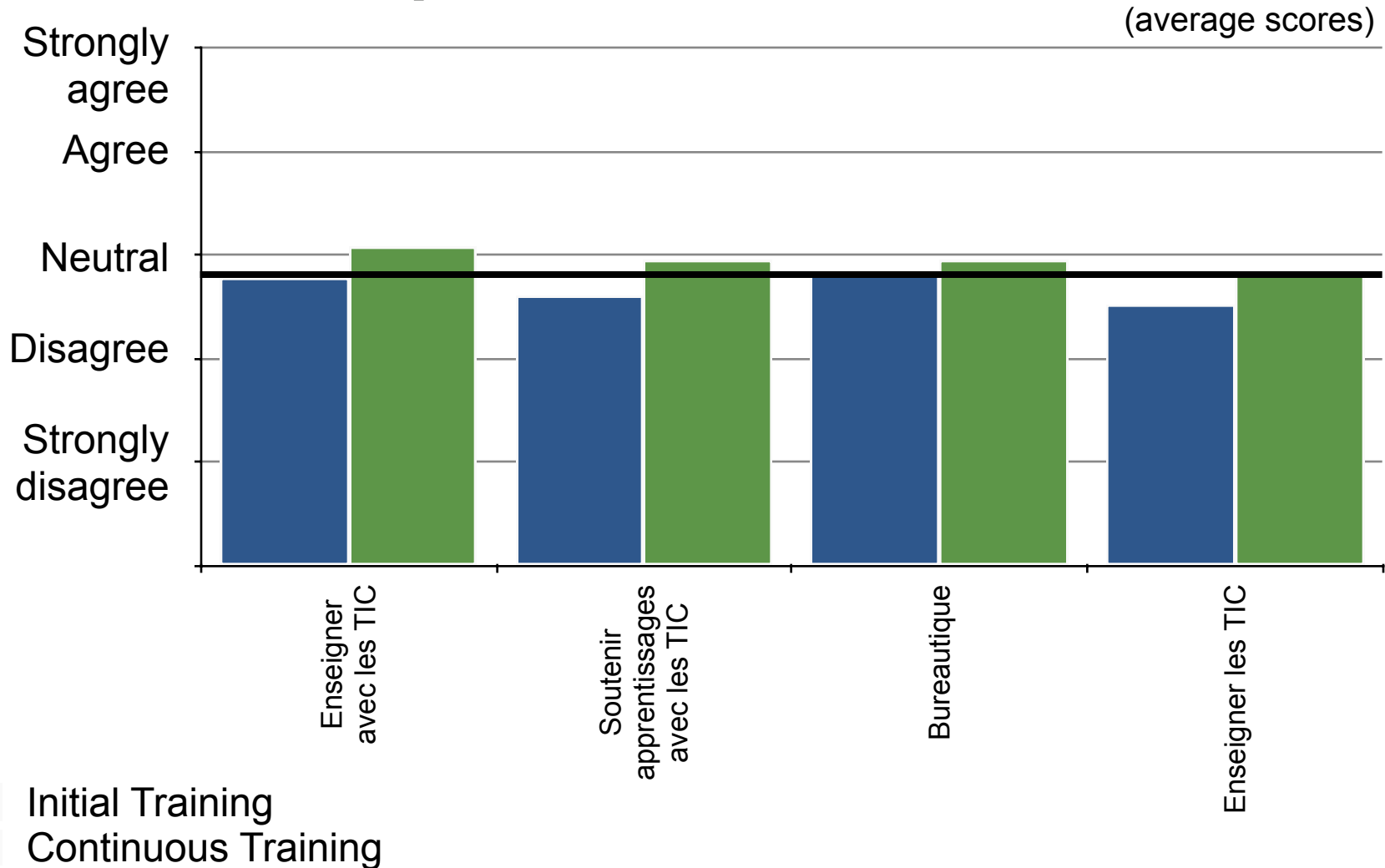
Private use of ICT: tasks



ICT competencies

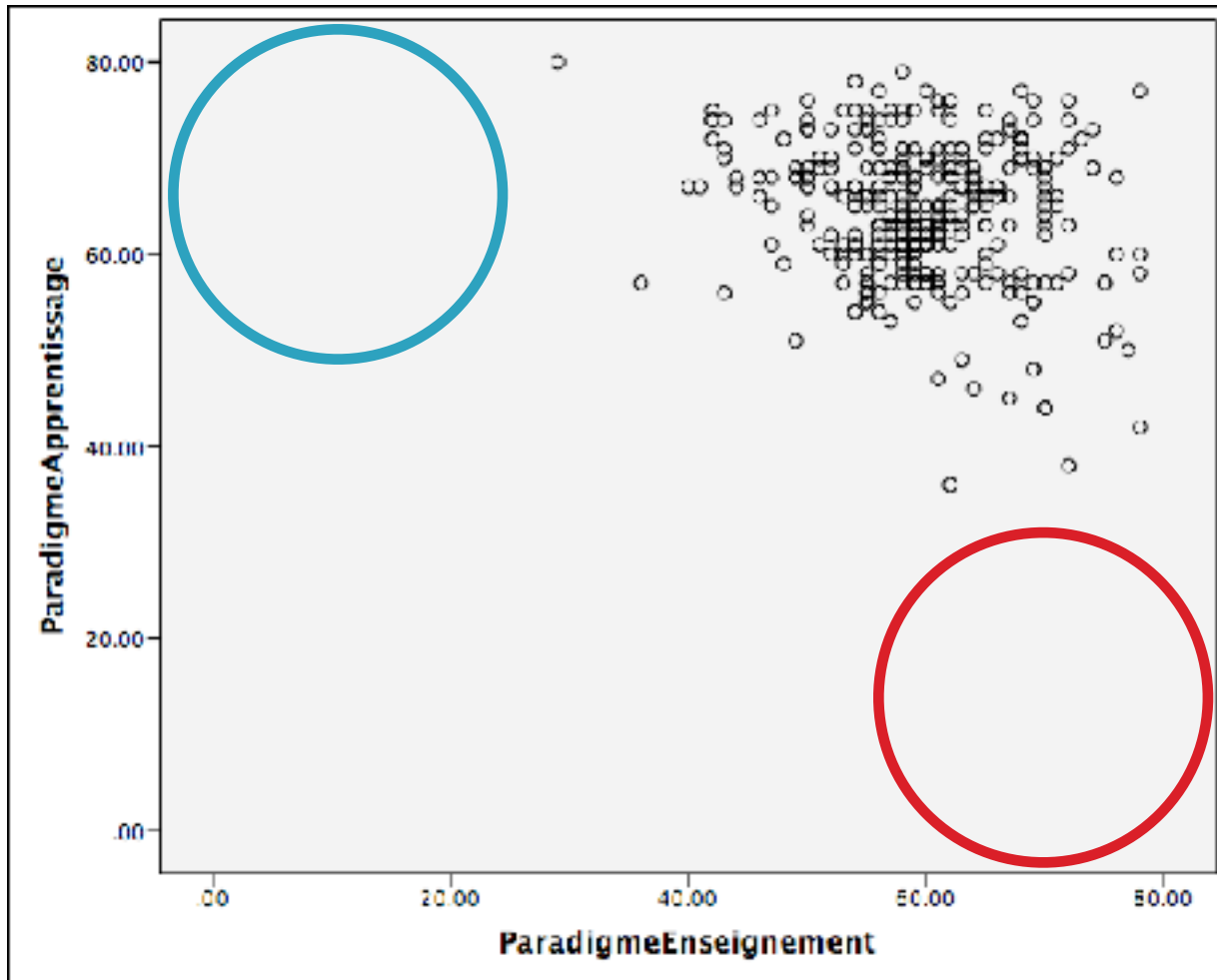


EdTech competencies



Results

Pedagogical beliefs



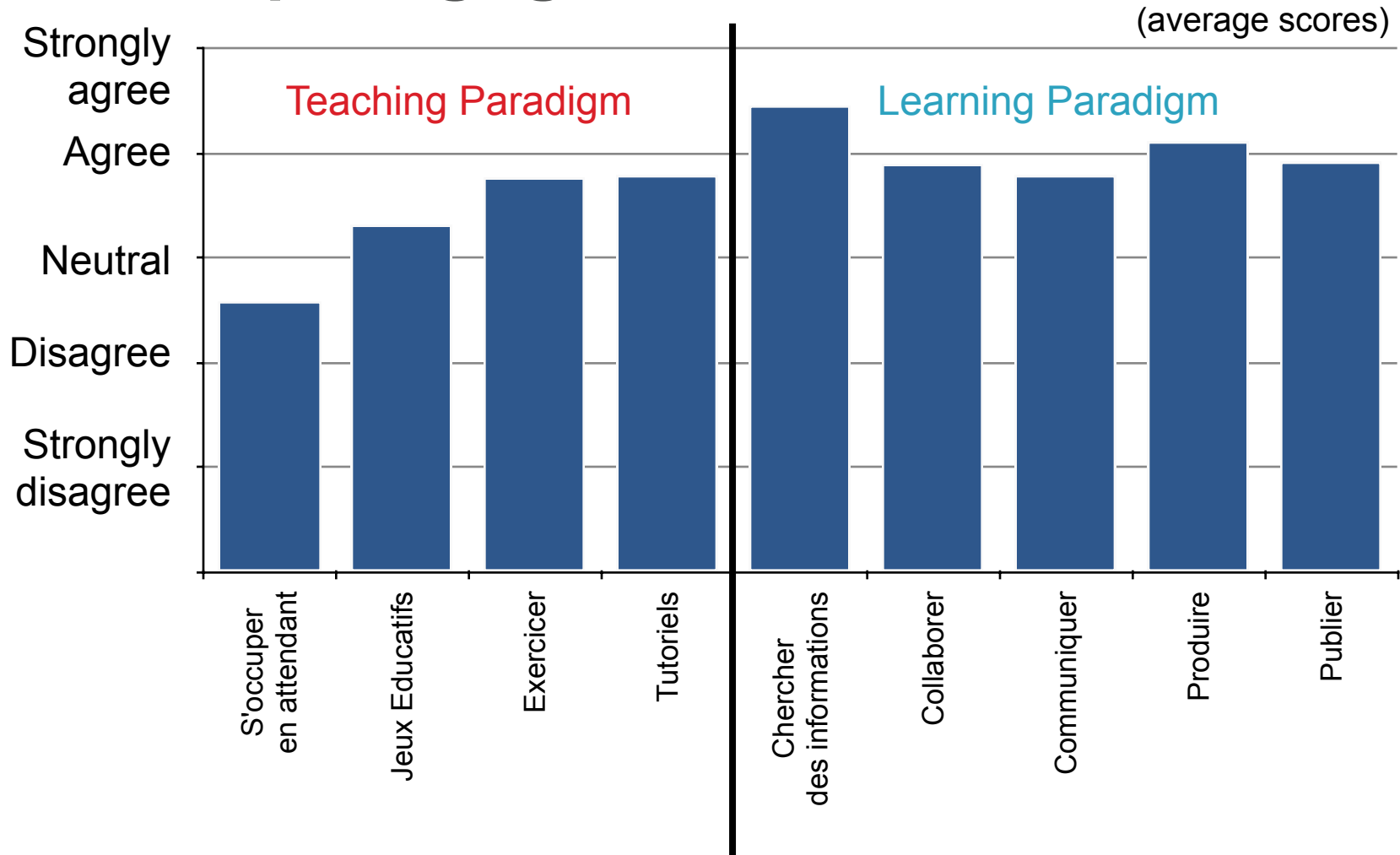
Mixed positions

No clear dichotomy
separating teachers

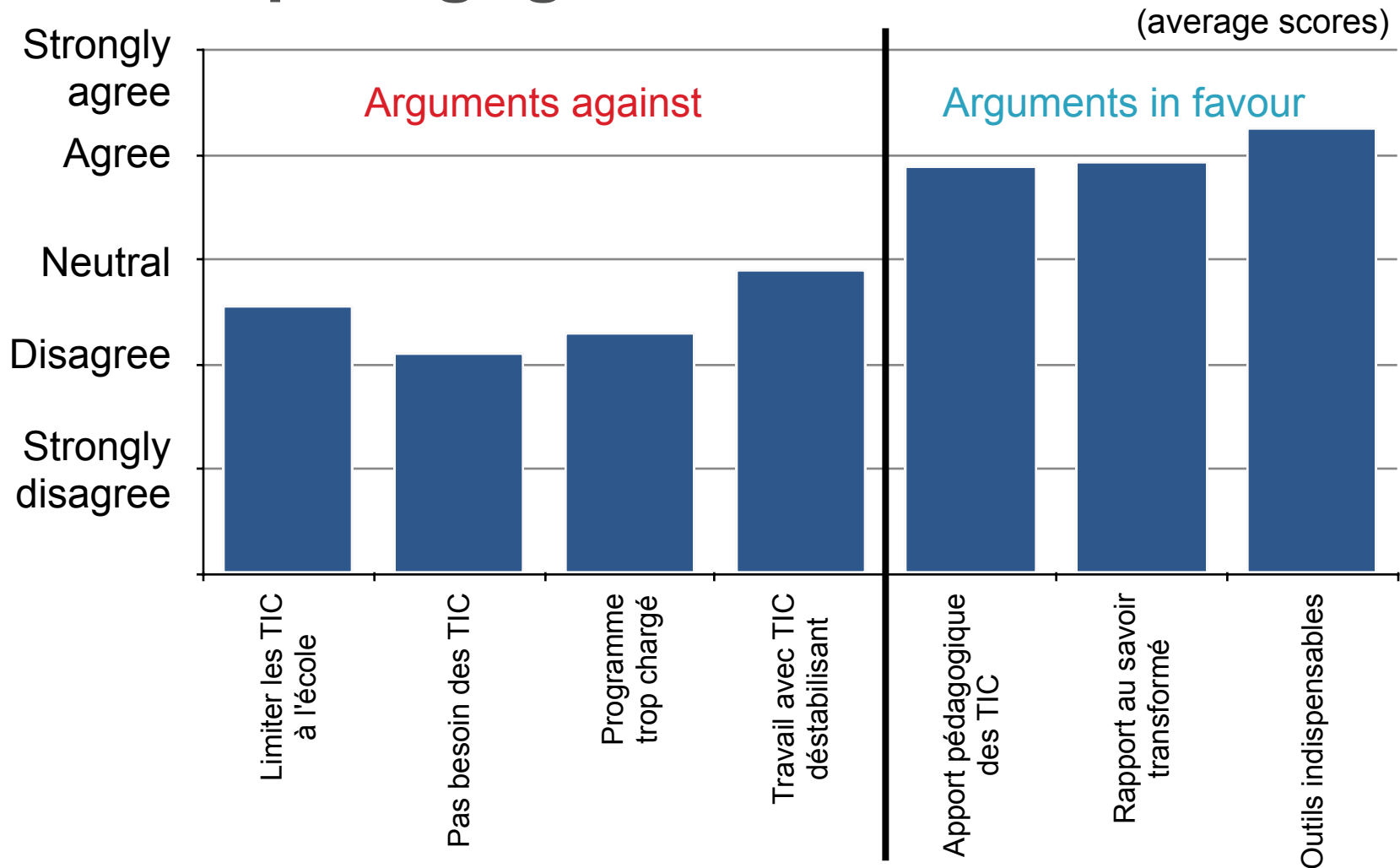
Problem with our items?

Results

Techno-pedagogical beliefs

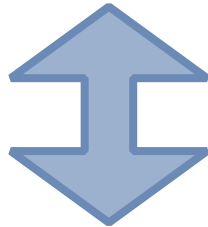


Techno-pedagogical attitudes



EdTech practices

Teacher-centred: Instruction



Learner-centred: Inquiry-based

Course preparation

In the classroom

Evaluation

Administratives tasks

Hardware used

Software used

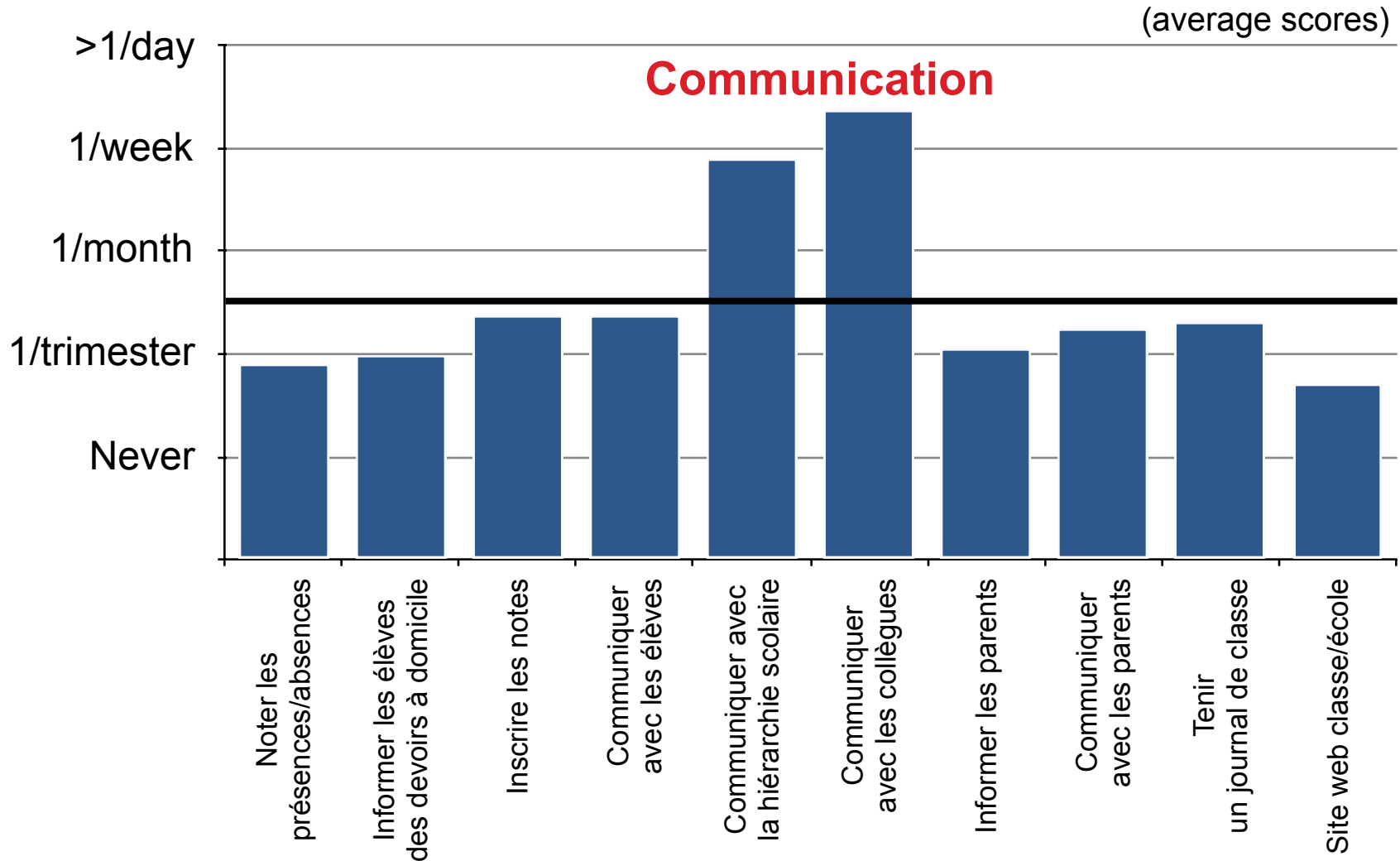
ICT as a content of learning

ICT as a tool
for learning & teaching

EdTech practices

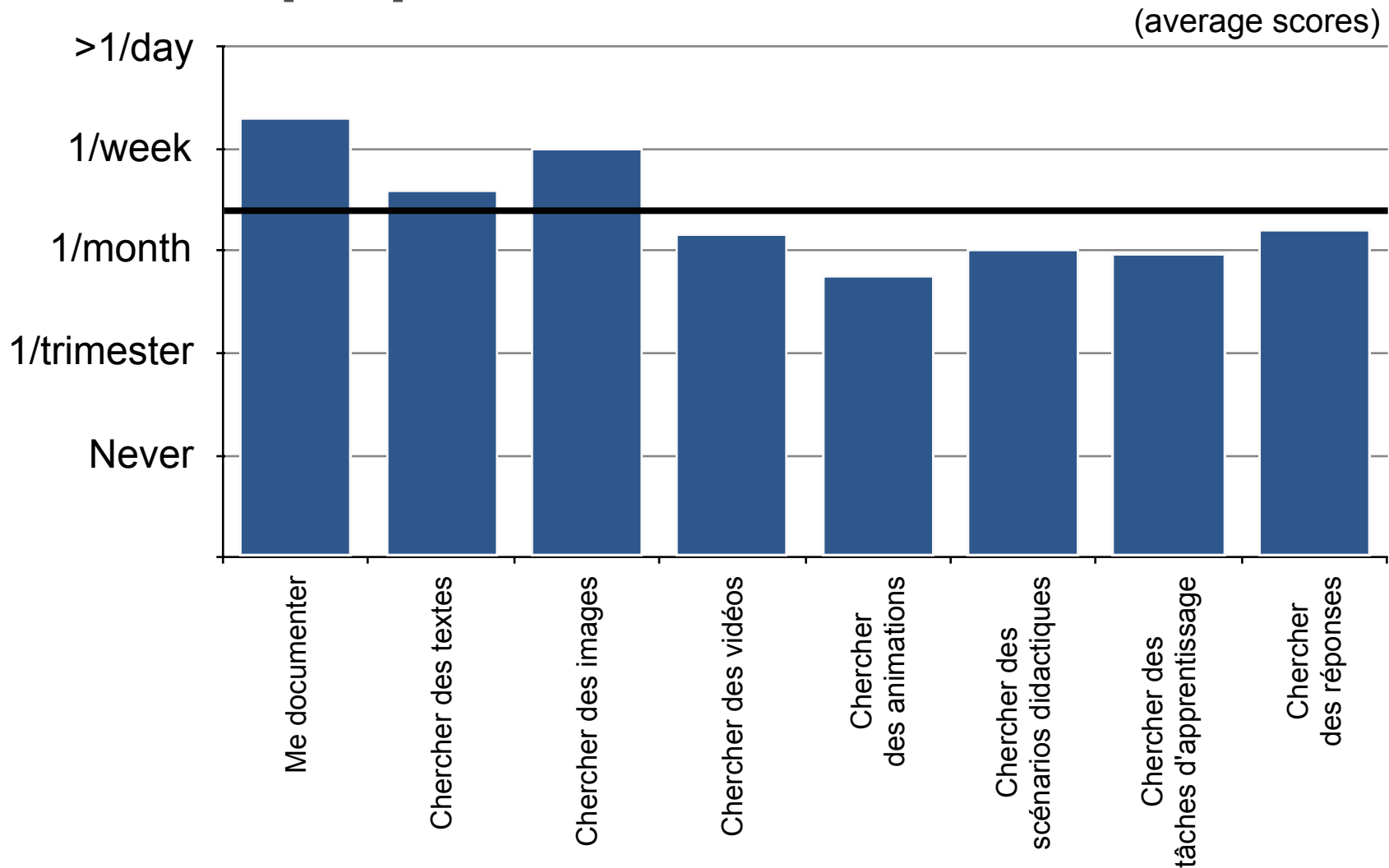
- Administratives tasks
- Course preparations
- Use of ICT in classrooms
 - ICT-supported teaching
 - ICT-supported learning
- Student evaluations

Administratives tasks



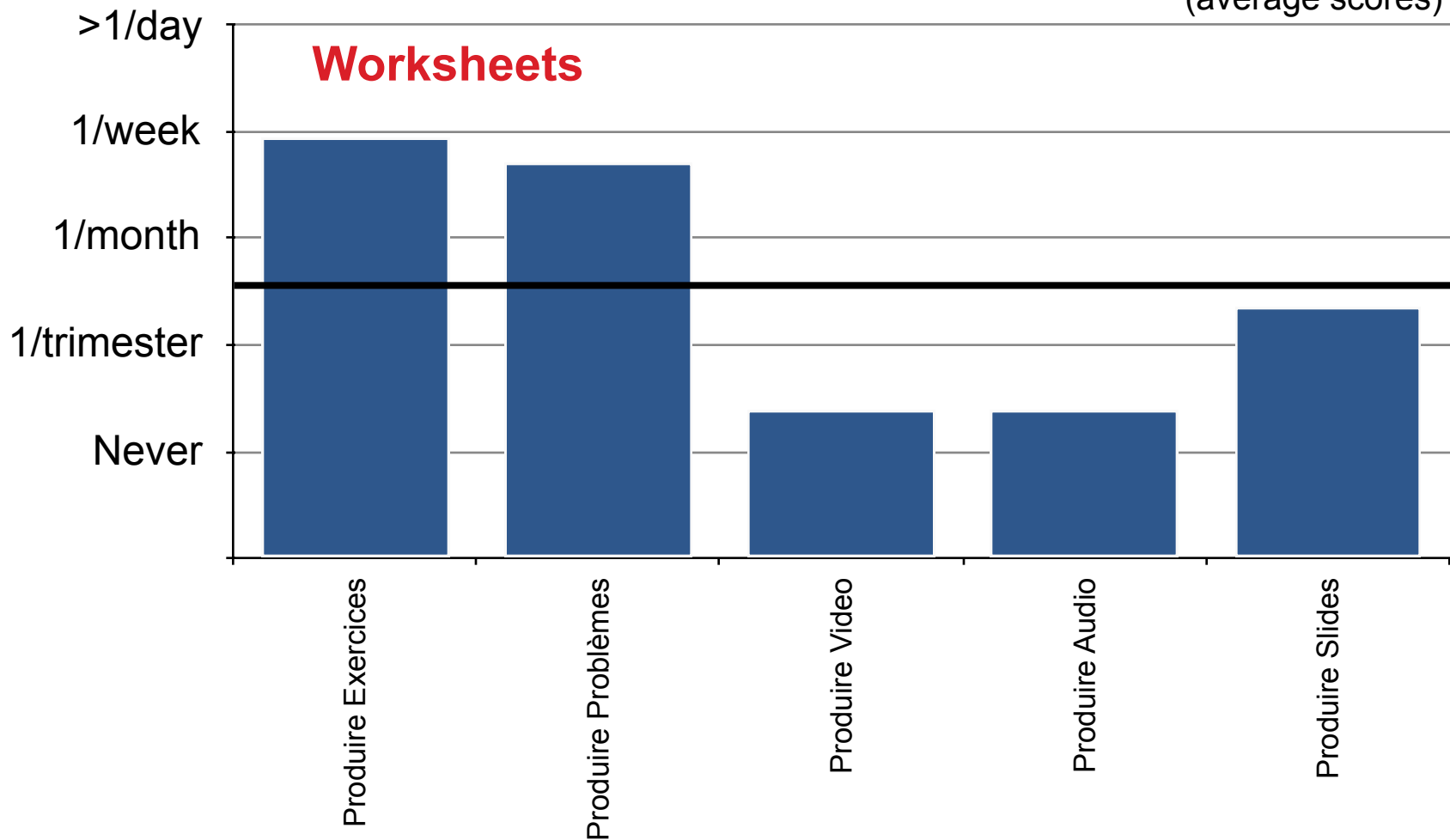
Results

Course preparations: Search

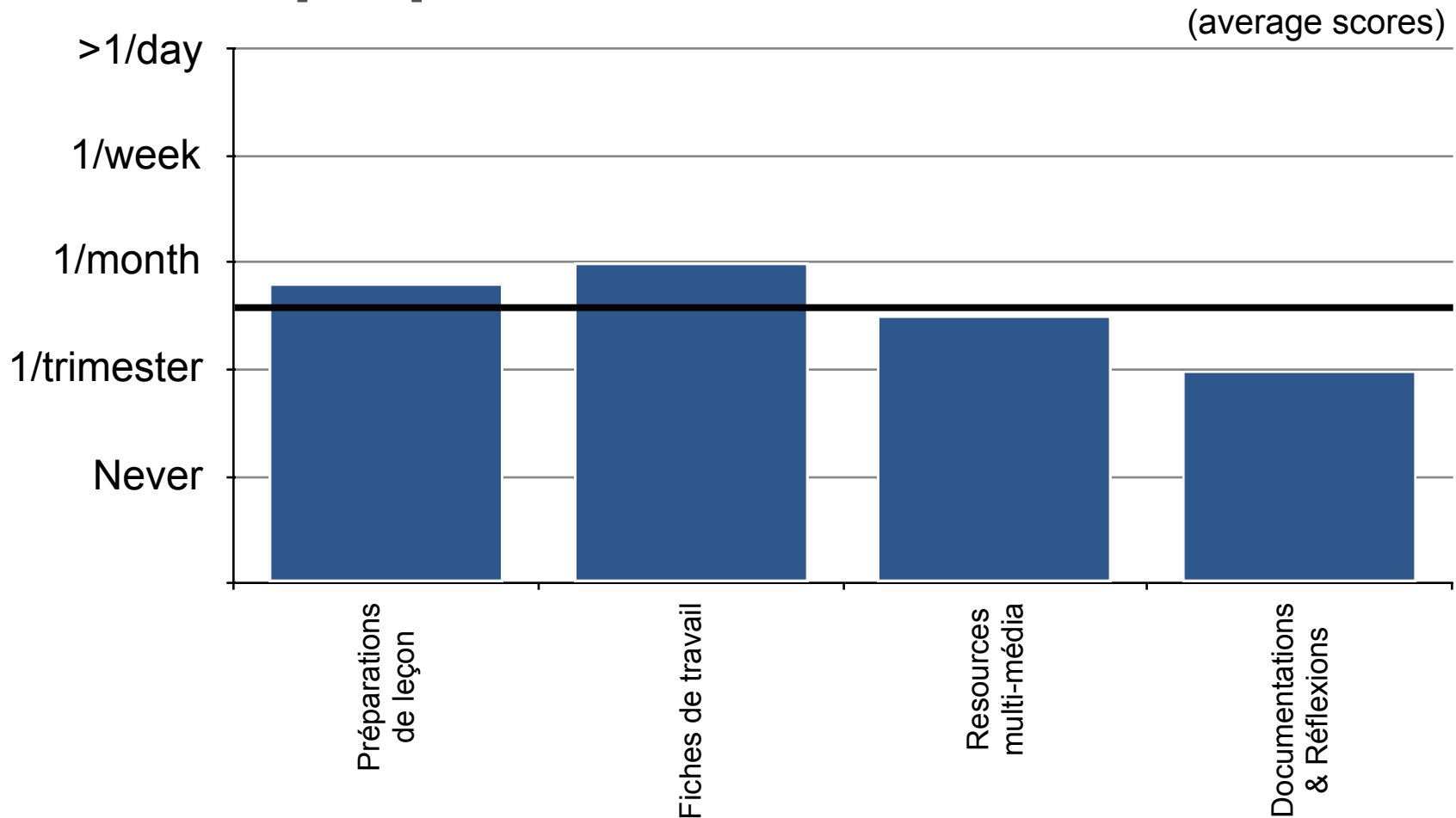


Course preparations: Produce

(average scores)

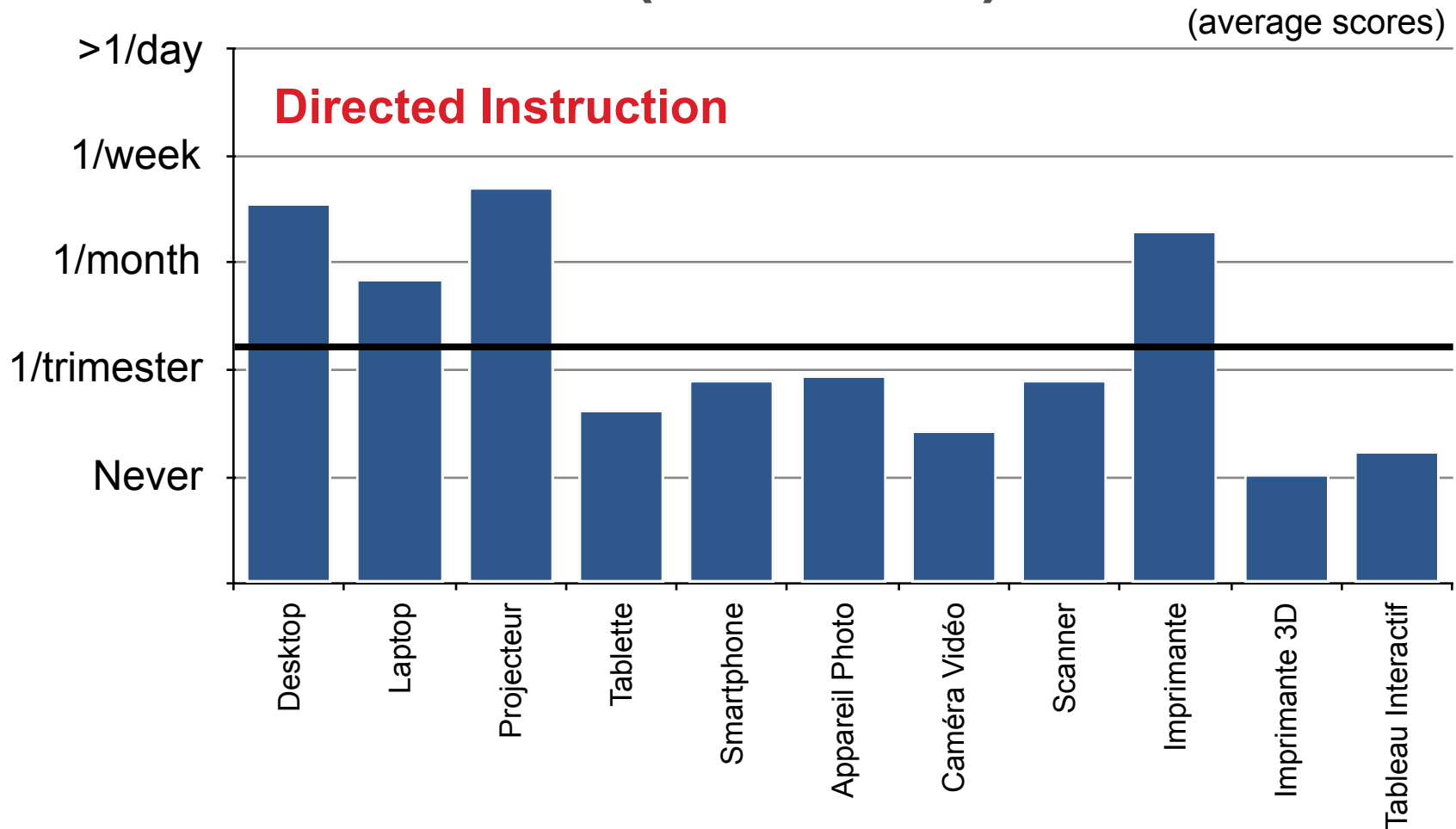


Course preparations: Share



Results

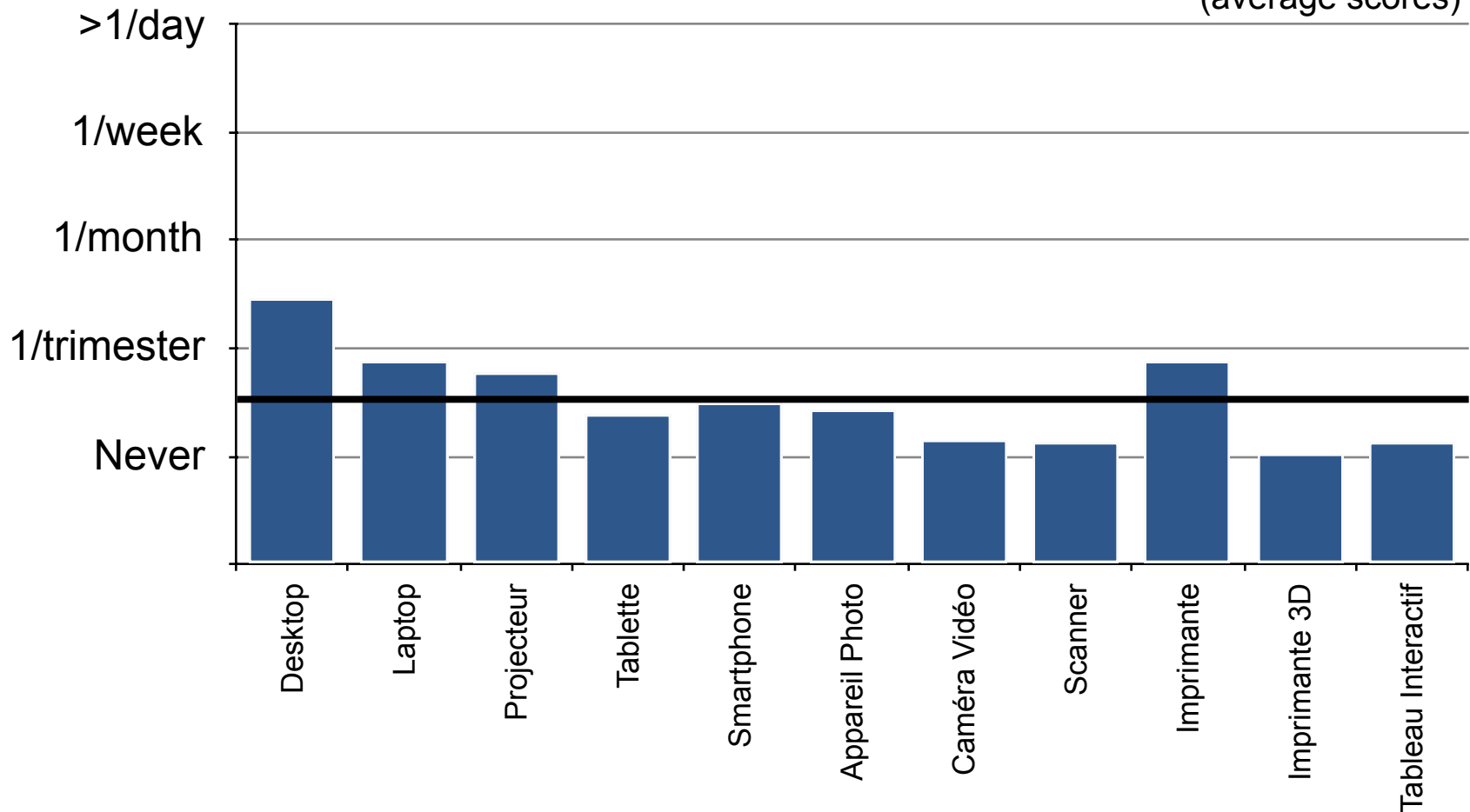
In class: Teacher (hardware)



Results

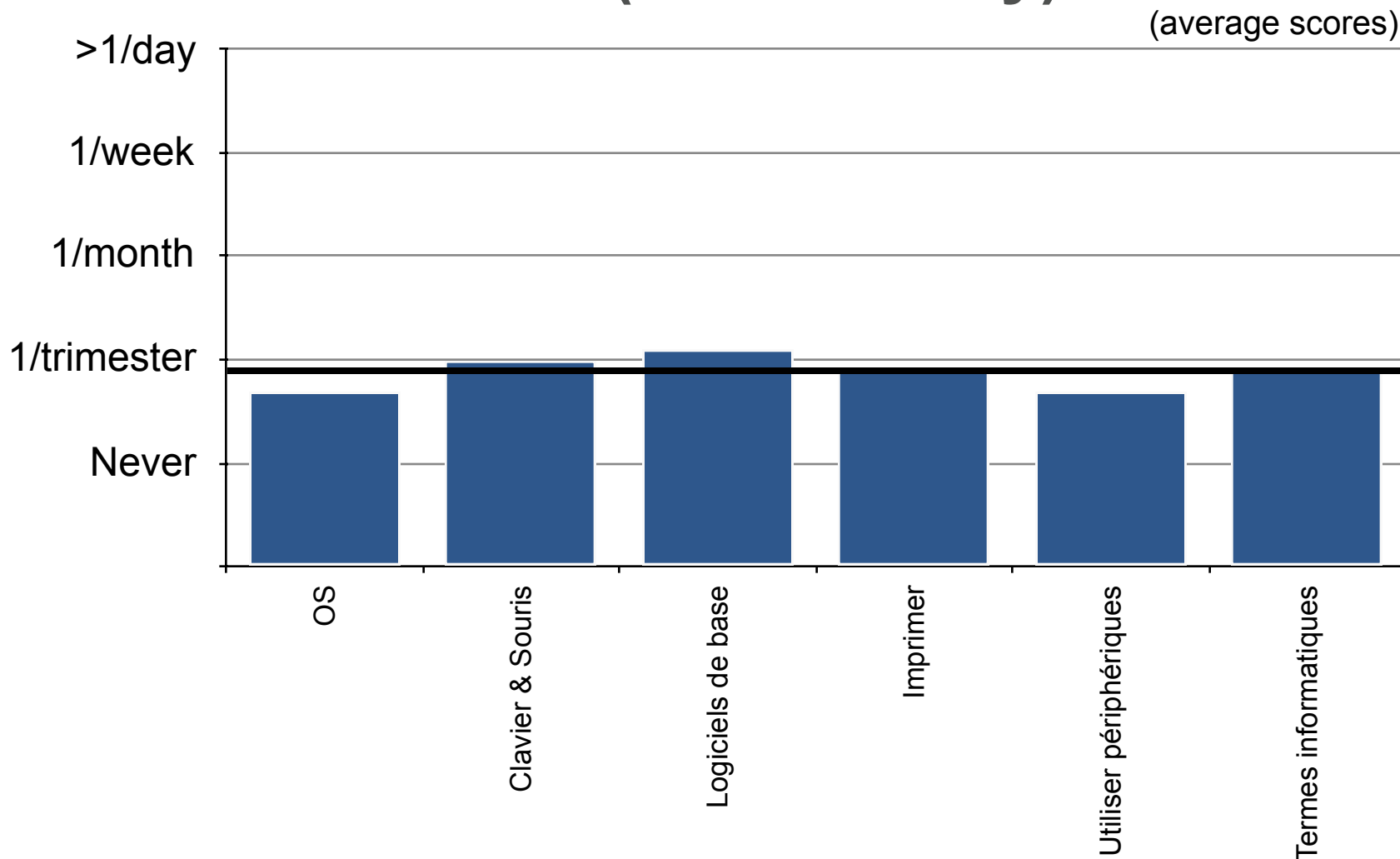
In class: Students (hardware)

(average scores)



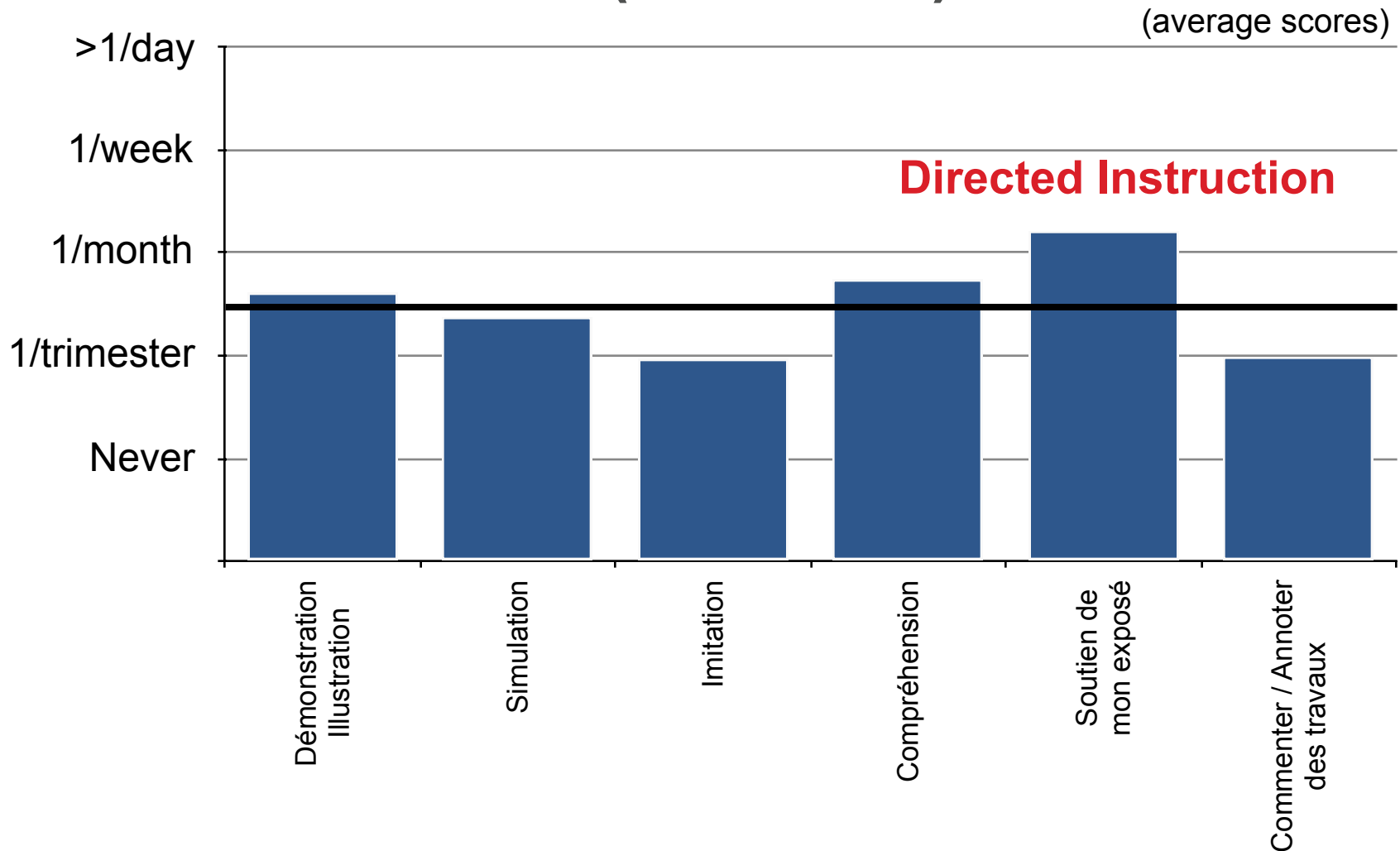
Results

In class: Teacher (ICT Literacy)



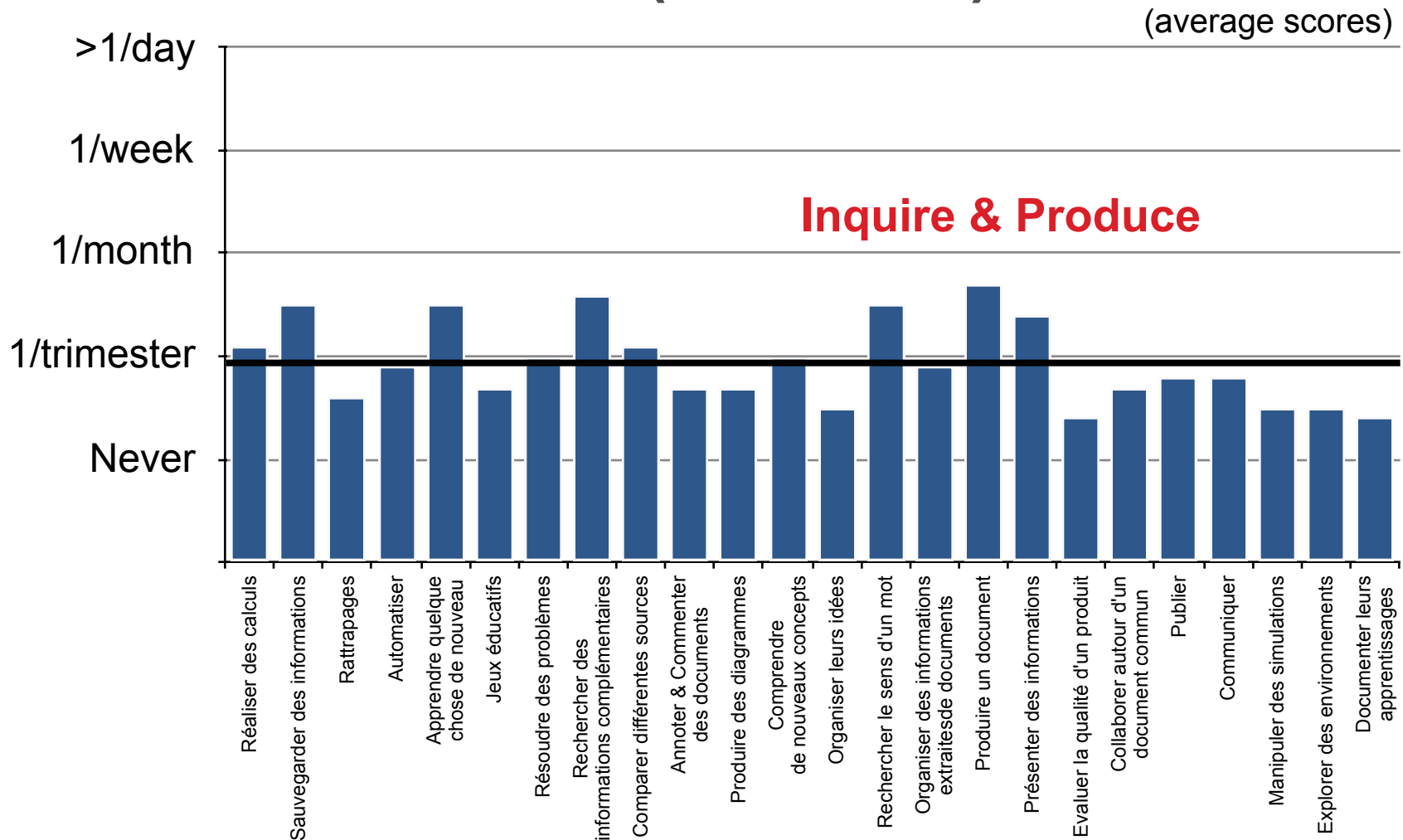
Results

In class: Teacher (activities)

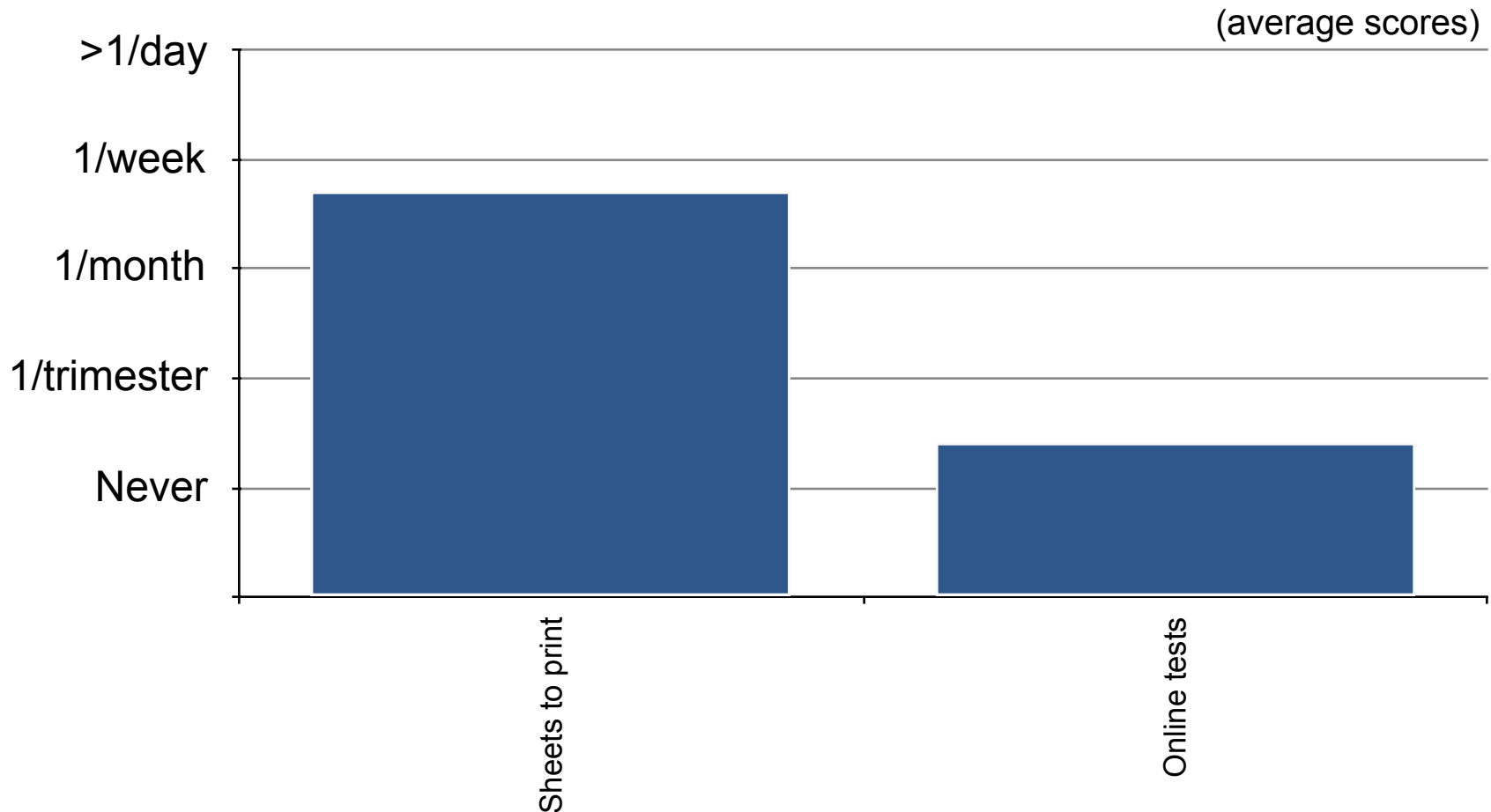


Results

In class: Students (activities)



Student Evaluations



Conclusions

- **Rather high level of (self-declared) ICT skills and private use of ICT tools; but more consumers and communicators than multimedia producers**
- **Teachers use digital media for their own productivity: search for existing digital resources and tools**
- **ICT infrastructure more oriented towards ICT-supported instruction by teachers than towards inquiry-based learning by students**
- **Mixed pedagogical beliefs and favourable EdTech beliefs & attitudes**

Conclusions

- **Teachers are aware of the importance and relevance of ICT in education, as well as the transformative effects of ICT on learning & knowledge and want to stay up-to-date with their teaching practices**
- **However their EdTech competencies are less developed**
- **Current educational technology practices are relatively stable compared to the last national survey study done a few years ago (Linckels et al., 2009), they remain rather teacher-centred approach, while the wish to use ICT in education has increased**

- **Need to broaden wireless access to the Internet in schools**
- **Need to provide digital learning devices to (all) students, if we wish to move beyond teacher-centred uses of ICT in classrooms**
- **Need to develop a culture of sharing of educational resources in the teacher community**

- **Need to provide digital educational resources of high quality and (perceived as) in line with the curriculum**
- **Need to train teachers about meaningful and learner-centred “in class” educational technology practices**
- **Make national “digital education” policy more visible and desirable**
- **Need to make “technology use expectations” more explicit: dos & don’ts**

- **Beyond descriptive statistics: searches for meaningful relationships**
- **How to develop a shorter version of our survey? - number of constructs too large**
- **How to better understand (current) EdTech practices embedded in diverse niches of the (national) educational ecosystem? - part of larger research project, with variety of methods**

- **How to nurture a favourable educational technology school culture?**
- **Teachers as “digital producers”?**
- **How to develop effective teacher trainings (initial & continuous)?**

**THANK YOU FOR YOUR
ATTENTION!**

QUESTIONS?

Contact



<https://lu.linkedin.com/in/bobreuter>



<https://www.facebook.com/RReuterPhD/>



[@bobreuter](#)



<http://staff.uni.lu/robert.reuter>



robert.reuter@uni.lu