

Mathematics teachers' digital competencies to face challenges with teaching mathematics in the digital era

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Teacher's professional activity

Classroom lessons

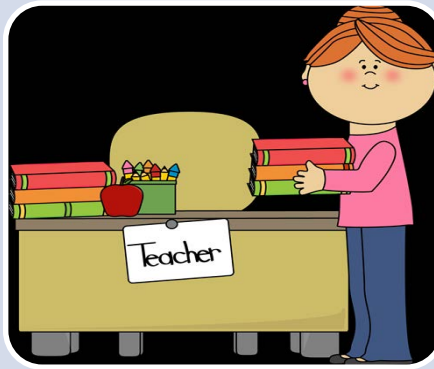


Preparation
Documentation
Marking
Continuous training
Communication with parents
Collaboration with colleagues
Monitoring students
...

Crédits photo : pixabay et Aurélien Agathon
<https://babaduprof.fr/les-taches-annexes-a-lenseignement/>

Teachers' professional use of technology

(Abboud-Blanchard and Lagrange, 2006)



Classroom interaction

- Teaching
- Assessing
- Monitoring student activity and performance

Preparation and planning

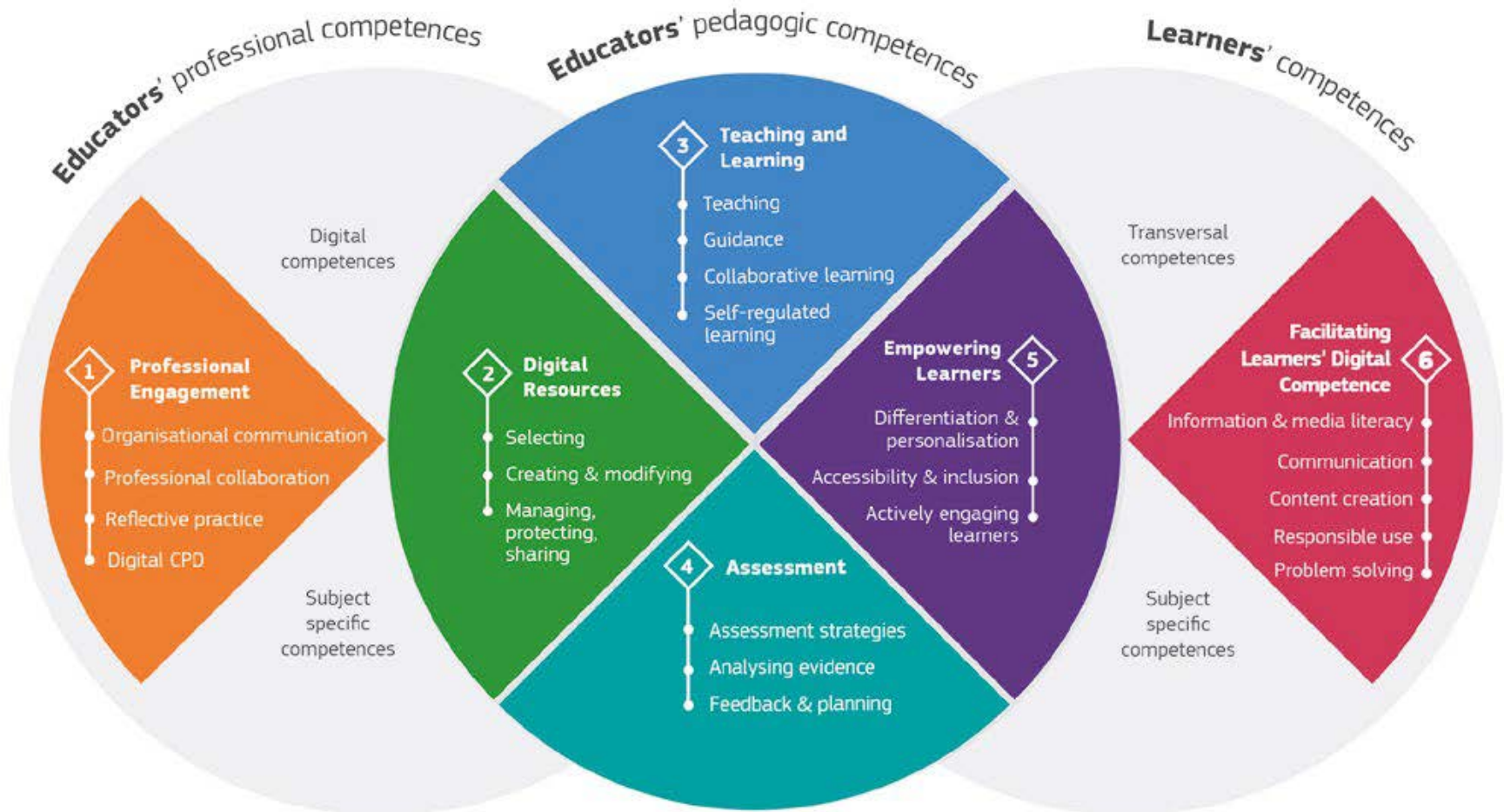
- Searching for, modifying, creating, resources
- Creating relevant digital learning environment

Communication, collaboration

- Communicating with parents, colleagues
- Collaborating with peers
- Lifelong learning

DigCompEdu framework

(Redecker, 2017)



Opportunities and digital competence



Classroom interaction

- Teaching
- Assessing
- Monitoring student activity and performance

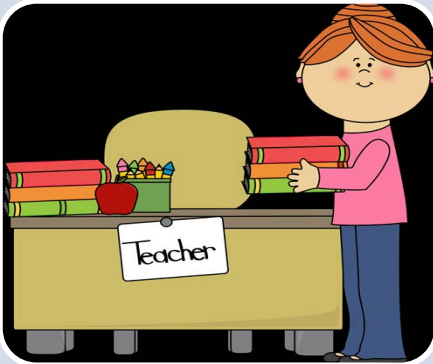
Technology supporting

- **students' mathematical activity** (dynamic geometry, spreadsheet, CAS, calculators, programming...)
- **classroom interactions** (IWB, projector...)
- **assessment activities** (Plickers, Socrative...)

Teachers' need to be able to

- **use available classroom technologies**
- **orchestrate instrumented activities** (accompany students interactions with technology toward targeted learning)
- **provide timely guidance** (observe & make decisions)

Opportunities and digital competence



Preparation and planning

- Searching for, modifying, creating, resources

- Creating relevant digital learning environment

Plethora of digital resources

- **personal devices** (computers, tablets, smartphones...)
- **software and pedagogical scenarios**
- **e-textbooks**
- **various digital content** (images, video, animations, apps, games...)

Teachers' need to be able to

- **choose appropriate technology** (know potentialities and constraints)
- **design technology-enhanced learning activities** (exploit technology learning potential)
- **identify, assess and select digital resources** (search strategies, resource quality evaluation)
- **create and modify resources** (consider learning goal, context, learner group)

Opportunities and digital competence



Communication, collaboration

- Communicating with parents, colleagues
- Collaborating with peers
- Lifelong learning

Technology supporting

- **communication with families** (school virtual learning environment...)
- **emergence of online communities** (sharing resources, practices, knowledge, experiences...)
- **teacher learning** (MOOC for teachers...)

Teachers' need to be able to

- **use technology to communicate with others** (effective and responsible communication strategies)
- **use technology to collaborate with others** (reflect on others' and own practices, provide and get feedback)
- **use digital resources for continuous professional development** (identify online training opportunities, webinars, tutorials...)

Challenges for teacher education

Variety and rapid evolution of technology

How can we prepare teachers to cope with emergent technologies?

Complexity of technology-based lesson management

How can we support teachers' classroom implementation of technology-enhanced learning situations?

Development of 21st century skills (P21)

How can we support the evolution of teachers' (digital) practices toward 21st century pedagogy?

References

- Abboud-Blanchard, M. & Lagrange, J.B. (2006). Uses of ICT by pre-service teachers: towards a professional instrumentation? *The International Journal for Technology in Mathematics Education*, 13(4), 183-191.
- Partnership for 21st century skills. <https://www.battelleforkids.org/networks/p21>
- Redecker, C. (2017). *European Framework for the Digital Competence of Educators (DigCompEdu)*. Joint Research Centre Science for Policy Report. EU: Luxembourg Publications Office.

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