Digital competence frameworks and self-assessment tools

A holistic perspective

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Christine Redecker
Yves Punie

Joint Research Centre
the European Commission's in-house science service

Platform of European Associations of VET Providers
Brussels, 23 June 2017
The European Commission’s Joint Research Centre at a glance

3000 staff
Almost 75% are scientists and researchers.
Headquarters in Brussels
Research facilities located in 5 Member States.

The in-house scientific service of the European Commission. It provides the scientific advice and technical know-how to support EU policies.
**MORE EVIDENCE ON DIGITAL-AGE LEARNING**

**MOOCknowledge** This on-going project aims to get a better understanding of the profile of (European) MOOC learners. MOOCknowledge is specifically interested in a) the socio-demographics characteristics of the learners, b) alternative success metrics based on the learner perspective, and c) the socioeconomic impact of MOOC-based education. The project is based on survey data and has signed agreements with more than 70 MOOCs. http://moocknowledge.eu/

**MOOCs4Inclusion** explores how free digital learning helps to develop and recognise the skills and competences of migrants and refugees for inclusion, integration, re-engagement in formal or non-formal education, employability and civic participation. http://moocs4inclusion.org/

**OPTEV** This project aims to measure the impact of the Polish e-textbooks initiative on academic achievement and explore the costs and savings associated to it.

**Blockchain for Education** is an exploratory study on the value and potential of digital accreditation of personal and academic learning, focusing on the potential of decentralized infrastructures for education (blockchain).

**LAEP** is a recent report summarising research evidence on the use of Learning Analytics and its implications for education policy. http://europa.eu/1vY43Dq

**CompuThink** report discusses the most significant developments for the integration of Computational Thinking and related concepts (e.g. coding, programing, algorithmic thinking) in compulsory education across Europe. It also provides a comprehensive synthesis of evidence, including implications for policy and practice. http://europa.eu/1gP95Tm

**New challenges and upcoming research**

In 2017, we will focus on analysing innovative (including digital) forms of teacher continuous professional development, both for obligatory schooling and higher education (CPDmodels). We will furthermore review innovative assessment formats and explore in-depth PISA 2015 data to assess the effect of digital technologies on cognitive learning outcomes (ICTinPISA).
THE DIGITAL TRANSFORMATION OF E&T

**Background**
Research on ICT for Learning and Skills started in 2005 with the aim to provide evidence-based policy support to the European Commission and Member States on harnessing the potential of digital technologies to innovate education and training practices, to improve access to lifelong learning and to deal with the rise of new (digital) skills and competences needed for employment, personal development and social inclusion. More than 20 major studies have been undertaken with more than 110 different publications.

**Current research at JRC-Seville**
Significant work has gone into developing frameworks promoting individuals' key competences and supporting the modernisation of organisational organisations and systems. These aim to establish a common language and understanding within Europe. They are accompanied by self-assessment tools for individual and organisational self-reflection, which also support training course development, measurement and policy initiatives.

Furthermore, a series of socio-economic research projects allows us to identify and analyse emerging changes in the learning landscape and to inform and advise policy makers accordingly.

COMPETENCE FRAMEWORKS

**DigComp** The Digital Competence Framework for Citizens was first published in 2013 and has recently been updated to DigComp 2.0. Many Member States have implemented DigComp as guideline for the development and assessment of citizens', teachers' and learners' digital competence.
https://ec.europa.eu/jrc/digcomp/

**EntreComp** The Entrepreneurship Competence Framework establishes 3 competence areas, 15 competences, 442 learning outcome statements along an 8 level progression model. Published in June 2016, it is being taken up in Europe and beyond, for national education evaluation exercises, curricula reforms but also for teacher training, from MOOCs to PhD programmes.

**DigCompConsumers** offers a reference framework to support and improve consumers' digital competence. It was jointly developed with DG JUST.
https://ec.europa.eu/jrc/digcompconsumers

**DigCompEdu** The Digital Competence Framework for Educators is currently being developed and will be published in the course of 2017. It will detail educator-specific competences for teaching in a digital society.
https://ec.europa.eu/jrc/digcompedu

SYSTEMIC INNOVATION

**DigCompOrg** provides a conceptual framework for the systematic integration of learning technologies in educational organisations, in all education sectors.
https://ec.europa.eu/jrc/digcomporg

**DigCompOrg4Schools** is devoted to the development of a self-assessment tool (called SELFIE) for schools digital capacity. The tool is going to be piloted in schools of 5 EU Member States (IT, ES, DK, EE, IE) and Russia (in collaboration with UNESCO IITE).

**DigEduPol** analyses existing national policy initiatives to identify effective policies for sustainable ICT-enabled innovation in education.
http://europa.eu/1MQ66Fd

**OpenEdu** presents a framework to support higher education institutions to open up education, thus promoting innovation. It details 10 dimensions, and proposes actions enabling the institutions to build their own open education strategies.
http://europa.eu/1Tx86BR

**OpenEdu Policies** makes policy recommendations for open education, designed from case study research, and analysis of policies from most European Member States.
https://ec
JRC.B.4 studies on Digital Competence

The European Digital Competence Framework for Citizens

DigCompEdu
Digital Competence Framework for Educators

DigCompOrg
Digitally Competent Educational Organisations
3 pillars for competence development

Current state

Change process

Future state

1. Conceptual Framework
   Holistic approach - Common understanding

2. Self-Assessment Tool
   Self-reflection, benchmarking & action plan for improvement

3. External evaluation & support
   External evaluation, recognition, training...

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DIGCOMP 2.0
THE DIGITAL COMPETENCE FRAMEWORK FOR CITIZENS
THE COMPETENCES

5 AREAS

1. Communication and collaboration
2. Information and data literacy
3. Digital content creation
4. Safety
5. Problem solving

21 COMPETENCES
Learning to swim in the Digital Ocean: THE DIGITAL COMPETENCE FRAMEWORK FOR CITIZENS (V. 2.1)

Foundation
- Level 1
  - SIMPLE TASKS
  - WITH GUIDANCE
  - REMEMBERING

Intermediate
- Level 2
  - WELL-DEFINED AND ROUTINE TASKS, AND STRAIGHTFORWARD PROBLEMS
  - ON MY OWN
  - UNDERSTANDING

Advanced
- Level 3
  - DIFFERENT TASKS AND PROBLEMS
  - GUIDING OTHERS
  - APPLYING

- Level 4
  - MOST APPROPRIATE TASKS
  - INDEPENDENT AND ACCORDING TO MY NEEDS
  - UNDERSTANDING

- Level 5
  - MOST APPROPRIATE TASKS
  - INDEPENDENT AND ACCORDING TO MY NEEDS
  - UNDERSTANDING

- Level 6
  - RESOLVE COMPLEX PROBLEMS WITH LIMITED SOLUTIONS
  - INTEGRATE TO CONTRIBUTE TO THE PROFESSIONAL PRACTICE AND TO GUIDE OTHERS
  - CREATING

- Level 7
  - RESOLVE COMPLEX PROBLEMS WITH MANY INTERACTING FACTORS
  - PROPOSE NEW IDEAS AND PROCESSES TO THE FIELD
  - CREATING

- Level 8
  - RESOLVE COMPLEX PROBLEMS WITH MANY INTERACTING FACTORS
  - PROPOSE NEW IDEAS AND PROCESSES TO THE FIELD
  - CREATING
DigCompOrg conceptual model
The three levels of DigCompOrg model

7 core elements, relevant to all sectors, plus a sector specific one
15 sub-elements
74 descriptors
2nd pilar: SELFIE self-reflection tool

SELFIE refers to online self-reflection tool for schools who want to reflect on their uptake of digital technologies for better learning.

The idea is that, every year, schools reflect on their current uptake of digital technologies for innovative and effective learning and take snapshots of where they stand. So, this is like a selfie!! Schools can share their 'selfie' with the others, as they like, as people do with their selfies in social media.

SELFIE is the abbreviation for:

Self-reflection on Effective Learning by Fostering Innovation through Educational Technology
SELFIE: evidence-based tools, bringing together theory and practice

DigCompOrg conceptual model

User consultation survey in 5 Member States: ES, IT, EE, IE, DK

Validated by experts, stakeholders and policy makers

Input by more than 5000 school leaders, teachers and students!
European Commission's Joint Research Centre, Human Capital and Employment Unit (JRC B.4 in short) has designed and run the study for EC’s Directorate General Education and Culture (DG EAC). JRC B.4 collaborates with a group of international experts.

- Jim Devine | Policy | Projects | Innovation, IRELAND
- Timmus Limited, UK
- Danish Technological Institute, DENMARK
- Tallinn University - Centre of Excellence in Educational, Innovation, ESTONIA
- EIM consultancy, SPAIN
- National Research Council, Institute of Educational Technology & INDIRE, ITALY
- UNESCO Institute for Information Technologies in Education
- National Forum for the Enhancement of Teaching & Learning in Higher Education, IRELAND
- ....
Participation in SELFIE pilots

✓ 13+1 countries
✓ 500+ schools:
  o primary
  o lower-secondary
  o Upper secondary - General
  o Upper secondary – VET
  o Public
  o Private
  o Charter

✓ School leaders
✓ Teachers
✓ Students
SELFIE – a flexible and customizable tool!
Translating SELFIE

Piloting SELFIE in 500+ schools

Developing & pre-testing the prototype SELFIE

Translating SELFIE
Piloting SELFIE in 500+ schools

Analysing the results from the pilots

Conducting additional (qualitative) research in selected schools
Expert & stakeholder consultation

Mid-November
Consolidated SELFIE

Dec 2017

End-November

May
June
September
October

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DigCompEdu

Educators' professional competences

DIGCOMP
1. Information
2. Communication
3. Content creation
4. Safety
5. Problem solving

Pedagogic competences

1. Professional Engagement
2. Digital Resources
3. Teaching and Learning
4. Assessment
5. Empowering Learners
6. Facilitating Learners' Digital Competence

Subject specific competences

Transversal competences

Learners' overall learning objectives
Why a new European framework?

**DIGCOMP**
- Information
  1.1 Browsing, searching and filtering
  1.2 Evaluating data, information and content
  1.3 Managing data, information and content
- Communication and collaboration
  2.1 Interacting through digital technologies
  2.2 Giving through digital technologies
  2.3 Collaborating through digital technologies
  2.4 Engaging in digital citizenship
- Content and creation
  3.1 Developing digital content
  3.2 Integrating and re-making
  3.3 Copyright and licences
  3.4 Programming
- Safety
  4.1 Protecting devices
  4.2 Protecting personal data and privacy
  4.3 Protecting health and wellbeing
  4.4 Protecting the environment
- Problem solving
  5.1 Solving technical problems
  5.2 Creating using digital technologies
  5.3 Identifying digital competence gaps
  5.4 Identifying needs and responses

**TPACK**
- Technological Pedagogical Content Knowledge (TPACK)
  - Technological Pedagogical Knowledge (TPK)
  - Technological Content Knowledge (TCK)
  - Pedagogical Content Knowledge (PCK)

**UNECO ICT CFT**
- UNESCO ICT Competency Framework for Teachers, 2011
- Version 2.0 form 2011; 3rd version currently underway
- Internationally recognized
- Take-up with adaptations and transformations in many African countries
- In Europe, Ireland is using it as a basis

**ISTE Standards-T**
- Part of a set of standards for students, educators, administrators, coaches and computer science educators
- International Society for Technology in Education, US-based
- In Europe, used in Estonia

**MENTEP**
- Developed by EUN
- Integrates DIGCOMP
- Linked to a self-assessment tool for teachers which is currently being piloted

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Not targeted at educators
Used as teacher competence framework in Spain and France

Model often quoted in the scientific literature and used as a point of departure by some member states (Austria, Finland)

Incomplete

Designed for developing countries
US discourse
Basis to build on
Synthesize all existing models and instruments into one generic framework as a common frame of reference.
What can a European framework contribute?

**Shared understanding**
Provide a common language and shared understanding of the key elements of educators' digital competence (all levels).

**Innovation**
Explain how educators' digital competence can contribute to innovation in education.

**Progression**
Indicate how digital competence progresses and can be developed, on the individual level.

**Assessment**
Allow to understand current levels of digital competence and development needs.

**Training**
Understand what kind of training and CPD could boost educators' competences.
DigCompEdu Project Methodology

Phase I: June-Oct 2016
- Literature Review
- Desk Research
- Inventory
- Meta-Analysis
- Proposal

Phase II: October 2016-February 2017
- Expert Workshop
- Stakeholder Consultation
- Revision
- Teachers: eTwinning Workshops

Phase III: March-May 2017
- Peer Review
- Stakeholder Consultation
- Validation
- Teachers: Online Consultation

Final Framework with self-assessment questionnaire

On behalf of DG EAC
## 1. Professional Engagement

<table>
<thead>
<tr>
<th>1.1 Communication</th>
<th>1.2 Professional collaboration</th>
<th>1.3 Reflective practice</th>
<th>1.4 Continuous professional development (CPD)</th>
</tr>
</thead>
</table>

## 2. Digital Resources

<table>
<thead>
<tr>
<th>2.1 Selecting</th>
<th>2.2 (Co-)creating</th>
</tr>
</thead>
</table>

## 3. Teaching and Learning

### Using digital technologies to enhance & innovate

<table>
<thead>
<tr>
<th>3.1 Teaching</th>
<th>3.2 Guidance</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.3 Collaborative learning</td>
<td>3.4 Self-regulated learning</td>
</tr>
</tbody>
</table>

## 4. Assessment

### Using digital technologies to enhance & innovate

<table>
<thead>
<tr>
<th>4.1 Assessment strategies</th>
<th>4.2 Analysing evidence</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.3 Feedback &amp; planning</td>
<td></td>
</tr>
</tbody>
</table>

## 5. Empowering Learners

### Using digital technologies to empower learners by facilitating:

<table>
<thead>
<tr>
<th>5.1 Accessibility &amp; inclusion</th>
<th>5.2 Differentiation &amp; personalisation</th>
<th>5.3 Actively engaging learners</th>
</tr>
</thead>
</table>

## 6. Facilitating Learners’ Digital Competence

<table>
<thead>
<tr>
<th>6.1 Information &amp; media literacy</th>
<th>6.2 Communication</th>
<th>6.3 Content creation</th>
<th>6.4. Responsible use</th>
<th>6.5 Problem solving</th>
</tr>
</thead>
</table>

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**The DigCompEdu Framework**

June 2017 Final
Example: Digital Resources

1. Professional engagement

2. Digital Resources

3. Teaching and Learning

4. Assessment

5. Empowering Learners

6. Facilitating Learners’ Digital Competence

1.2 Organisational communication
To use digital technologies to enhance organisational communication with learners, parents and third parties. To contribute to collaboratively developing and improving organisational communication strategies.

2.1 Selecting digital resources
To identify, assess and select digital resources for teaching and learning. To consider the specific learning objective, context, pedagogical approach, and learner group, when selecting digital resources and planning their use.

1.4 Digital Continuous Professional Development (CPD)
To use digital sources and resources for continuous professional development.

1.2 Professional collaboration
To use digital technologies to engage in collaboration with other educators, sharing and exchanging knowledge and experience and collaboratively innovating pedagogic practices.

2.2 Creating and modifying digital resources
To modify and build on existing openly licensed resources and other resources where this is permitted. To create or co-create new digital educational resources. To consider the specific learning objective, context, pedagogical approach, and learner group, when designing digital resources and planning their use.

3.1 Teaching
To plan for and implement digital devices and resources into the teaching process, so as to enhance the effectiveness of teaching interventions. To appropriately scaffold, manage and orchestrate digital teaching interventions. To experiment with and develop new formats and pedagogical methods for instruction.

3.2 Guidance
To use digital technologies and services to enhance the interaction with learners, individually and collectively, within and outside the learning session. To use digital technologies to offer timely and targeted guidance and assistance. To experiment with and develop new formats and formats for offering guidance and support.

3.3 Collaborative learning
To use digital technologies to foster and enhance learner collaboration. To enable learners to use digital technologies as part of collaborative assignments, as means for enhancing communication and collaboration and for collaborative knowledge creation.

3.4 Self-regulated learning
To use digital technologies to support self-regulated learning processes, i.e. to enable learners to plan, monitor and reflect on their own learning, evidence progress, share insights and come up with creative solutions.

4.1 Assessment strategies
To use digital technologies for formative and summative assessment. To enhance the diversity and suitability of assessment formats and approaches.

3.1 Teaching
To use digital technologies and services to enhance the interaction with learners, individually and collectively, within and outside the learning session. To use digital technologies to offer timely and targeted guidance and assistance. To experiment with and develop new formats and formats for offering guidance and support.

4.2 Analysing evidence
To generate, select, critically analyse and interpret digital evidence on learner activity, performance and progress, in view of informing teaching and learning.

4.3 Feedback and Planning
To use digital technologies to provide targeted and timely feedback to learners. To adapt teaching strategies accordingly and to provide targeted support, based on the evidence generated by the digital technologies used. To enable learners and parents to understand the evidence provided by digital technologies and use it for decision-making.

5.1 Accessibility and inclusion
To ensure accessibility to learning resources and activities, for all learners, including those with special needs. To consider and respond to learners’ (digital) expectations, abilities, uses and misconceptions, as well as contextual, physical or cognitive constraints to their use of digital technologies.

5.2 Differentiation and personalisation
To use digital technologies to address learners diverse learning needs, by allowing learners to advance at different levels and speeds, follow individual learning pathways and goals.

5.3 Actively engaging learners
To use digital technologies to foster learners’ active and creative engagement with a subject matter. To use digital technologies within pedagogic strategies that foster learners’ transversal skills, open learning to new, real-world contexts, involve learners themselves in hands-on activities, scientific investigation and complex problem solving, or in other ways increase learners’ active engagement and creative expression.

6.1 Information and media literacy
To incorporate learning activities, assignments and assessments which require learners to articulate information needs; to find information and resources in digital environments; to organise, process, analyse and interpret information; and to compare and critically evaluate the credibility and reliability of information and their sources.

6.2 Digital communication & collaboration
To incorporate learning activities, assignments and assessments which require learners to effectively and responsibly use digital technologies for communication, collaboration and civic participation.

6.3 Digital content creation
To incorporate assignments and learning activities which require learners to express themselves through digital means, and to modify and create digital content in different formats. To teach learners how copyright and licences apply to digital content, how to reference sources and attribute licenses.

6.4. Responsible use
To take measures to ensure learners’ physical, psychological and social wellbeing while using digital technologies. To empower learners to manage risks and use digital technologies safely and responsibly.

6.5 Digital problem solving
To incorporate learning and assessment activities which require learners to identify and solve technical problems or to transfer technological knowledge creatively to new situations.
## 3. Teaching and Learning

### 3.1 Teaching

To plan for and implement digital devices and resources into the teaching process, so as to enhance the effectiveness of teaching interventions. To appropriately scaffold, manage and orchestrate digital teaching interventions. To experiment with and develop new formats and pedagogical methods for instruction.

<table>
<thead>
<tr>
<th>Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>• To use classroom technologies to support instruction, e.g. electronic whiteboards, mobile devices</td>
</tr>
<tr>
<td>• To structure the lesson so that different (teacher-led and learner-led) digital activities jointly reinforce the learning objective</td>
</tr>
<tr>
<td>• To set up learning sessions, activities and interactions in a digital environment</td>
</tr>
<tr>
<td>• To structure and manage content, collaboration and interaction in a digital environment</td>
</tr>
<tr>
<td>• To consider how educator-led digital interventions – whether face-to-face or in a digital environment - can best support the learning objective</td>
</tr>
<tr>
<td>• To reflect on the effectiveness and appropriateness of the digital pedagogical strategies opted for and flexibly adjust methods and strategies</td>
</tr>
<tr>
<td>• To experiment with and develop new formats and pedagogical methods for instruction (e.g. flipped classroom)</td>
</tr>
</tbody>
</table>

### Progression

<table>
<thead>
<tr>
<th>Newcomer (A1)</th>
<th>Explorer (A2)</th>
<th>Integrator (B1)</th>
<th>Expert (B2)</th>
<th>Leader (C1)</th>
<th>Pioneer (C2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Making little use of digital technologies for instruction</td>
<td>Making basic use of available digital technologies for instruction</td>
<td>Integrating available digital technologies meaningfully into the teaching process</td>
<td>Using digital technologies purposefully to enhance pedagogic strategies</td>
<td>Orchestrating, monitoring and flexibly adapting the use of digital technologies to enhance pedagogic strategies.</td>
<td>Using digital technologies to innovate instructional strategies</td>
</tr>
</tbody>
</table>

### Proficiency statements

<table>
<thead>
<tr>
<th>Newcomer/A1</th>
<th>Explorer/A2</th>
<th>Integrator/B1</th>
<th>Expert/B2</th>
<th>Leader/C1</th>
<th>Pioneer/C2</th>
</tr>
</thead>
<tbody>
<tr>
<td>✓ I do not or only very rarely use digital devices or digital content in my teaching.</td>
<td>✓ I use available classroom technologies, e.g. digital whiteboards, projectors, PCs.</td>
<td>✓ I organise and manage the integration of digital devices (e.g. classroom technologies, students’ devices) into the teaching and learning process.</td>
<td>✓ I consider appropriate social settings and interaction modes when integrating digital technologies.</td>
<td>✓ I structure and manage content, contributions and interaction in a digital environment.</td>
<td>✓ I provide full courses or learning modules in a digital learning environment.</td>
</tr>
<tr>
<td>✓ I fit the choice of digital technologies to the learning objective and context.</td>
<td>✓ I manage the integration of digital content, e.g. videos, interactive activities, into the teaching and learning process.</td>
<td>✓ I organise and manage the integration of digital devices (e.g. classroom technologies, students’ devices) into the teaching and learning process.</td>
<td>✓ I use digital technologies in teaching to increase methodological variation.</td>
<td>✓ I structure the lesson so that different (teacher-led and learner-led) digital activities jointly reinforce the learning objective.</td>
<td>✓ I experiment with and develop new formats and pedagogical methods for instruction.</td>
</tr>
<tr>
<td>✓ I set up learning sessions or other interactions in a digital environment.</td>
<td>✓ I continuously evaluate the effectiveness of digitally enhanced teaching strategies and revise my strategies accordingly.</td>
<td></td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>
## Proficiency Progression

<table>
<thead>
<tr>
<th>Newcomer (A1)</th>
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<th>Pioneer (C2)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1. Professional Engagement</strong></td>
<td>Making little use; Being unsure</td>
<td>Being aware; Basic tool use</td>
<td>Effective use; Responsible use; Experimentation</td>
<td>Structured; Creative; Responsive; Transparent; Reflected practice</td>
<td>Critically, Strategically: Evaluating, Discussing, Reflecting</td>
</tr>
<tr>
<td><strong>2. Digital Resources</strong></td>
<td>Making little use; Being unsure</td>
<td>Being aware; Basic tool use</td>
<td>Basic criteria; Basic strategies Some advanced features</td>
<td>Advanced strategies; Complex criteria; Creating resources</td>
<td>Comprehensively using Advanced tools; Publishing resources</td>
</tr>
<tr>
<td><strong>3. Teaching and Learning</strong></td>
<td>Making little use; Being unsure</td>
<td>Being aware; Basic tool use</td>
<td>Integrating &amp; Implementing meaningfully</td>
<td>Enhancing, Scaffolding</td>
<td>Orchestrating; flexibly adapting; strategically; purposefully</td>
</tr>
<tr>
<td><strong>4. Assessment</strong></td>
<td>Making little use; Being unsure</td>
<td>Basic tool use within traditional approaches</td>
<td>Employing digital technologies to enhance traditional approaches</td>
<td>Strategic, Effective use</td>
<td>Comprehensive, Critical, Reflective practice</td>
</tr>
<tr>
<td><strong>5. Empowering Learners</strong></td>
<td>Making little use; Being unsure</td>
<td>Being aware; Basic tool use</td>
<td>Addressing learner empowerment</td>
<td>Strategically using a Range of tools to empower</td>
<td>Comprehensively, Critically Enhancing</td>
</tr>
<tr>
<td><strong>6. Learners' DC</strong></td>
<td>Making little use of strategies for learners' DC</td>
<td>Encouraging learners to use digital technologies</td>
<td>Implementing activities fostering learners' DC</td>
<td>Strategically using a range of strategies</td>
<td>Comprehensively and critically fostering learners' DC</td>
</tr>
</tbody>
</table>