

Competences and Behavioural Indicators for Teaching and Learning with Technology for Teachers

Basic and Senior Level



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Version 1

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Introduction

Framework for Digital Competences of Lecturers was developed in 2021, commissioned by the zone Professional Development of the Acceleration Plan Education with ICT (Tondeur et al., 2023; Uerz et al., 2021)*. This framework describes the competences that are essential to the design of education which enables personalization and flexibilization through the use of technology and keeps up with an ever-changing society. It was developed for higher education, but it is also suitable for vocational education. Some higher and vocational education institutions in the Netherlands have already adopted this framework. The framework distinguishes four main dimensions (see [figure 1](#)):

1. Designing, implementing and evaluating education;
2. Empowering students for a digital society;
3. Professional conduct as a lecturer**;
4. Digital literacy for lecturers.

The framework subdivides these dimensions into sub-dimensions and underlying competences. The dimensions are not separate entities; they are interconnected. The link between ‘Empowering students for a digital society’ and ‘Digital literacy for lecturers’ may act as an example: for teachers to be able to educate students in digital literacy for living, learning and working, they must first be competent in this area themselves. In conjunction, all competences influence the actual use of technology in education and the extent to which teachers foster students’ digital literacy (Kooi et al., 2021).

HAN University of Applied Sciences aims for all HAN teachers to be demonstrably competent in technology enhanced education and fostering digital literacy within the next few years. The educational programme HAN Open Digital Horizons was set up to achieve this. The iXperium Centre of Expertise Teaching and Learning with ICT drives this programme and ensures an evidence-informed approach. The programme uses this framework as a scaffold. Teachers seem to need practical examples and further clarification of the competences addressed in the framework to properly assess their own actions and development needs. To cater to these needs, the iXperium

has formulated behavioural indicators to complement the competences in the framework. Pre-existing sets of behavioural indicators of teaching and learning with ICT on a basic and master level were used in this process (Coetsier et al., 2016; Coetsier et al., 2019; Gorissen et al., 2019). The current set is specifically aimed at teachers in (higher) vocational education and is validated in discussions with internal and external experts and practitioners.

These behavioural indicators describe examples of demonstrable and actionable behaviour that competent teachers might display. The behavioural indicators, therefore, answer the following question: What can you observe when someone is competent? By formulating clear, objectively observable behavioural indicators, this document facilitates a discussion of the teacher’s real-life behaviour. This allows teachers and assessors a more granular insight into the degree of competence achieved.

This document contains behavioural indicators on a basic and a senior level. The basic level indicates the behaviour of a teacher with a basic qualification. To describe behaviour on a senior level, the following criteria were applied:

- the behavioural indicators at the senior level cover the behavioural indicators at the basic level;
- a teacher at the senior level is expected to express a higher conceptual level (from overseeing, to seeing through, to influencing)
- a teacher at the senior level is expected to adopt a system perspective and to have an eye for actors and factors at different levels within the institution that are relevant for teaching and learning with technology;
- a teacher at the senior level is expected to reflect on education from a micro (own teaching practice, vision and competences), meso (teaching practice, vision and competences at the team level and school level), and macro perspective (developments in education within the region and country), this involves reasoning from the inside out as well as reasoning from the outside in;
- a teacher at the senior level is expected to substantiate their choices regarding the use of technology for

* This document is based on two closely related publications: [A framework for digital competences of lecturers](#) (Uerz et al., 2021) and [the HeDiCom framework: Higher Education teachers’ digital competencies for the future](#) (Tondeur et al., 2023).

** In this document, we will use the term ‘teachers’ synonymously with the ‘lecturers’ mentioned in the Framework (Uerz et al., 2021).

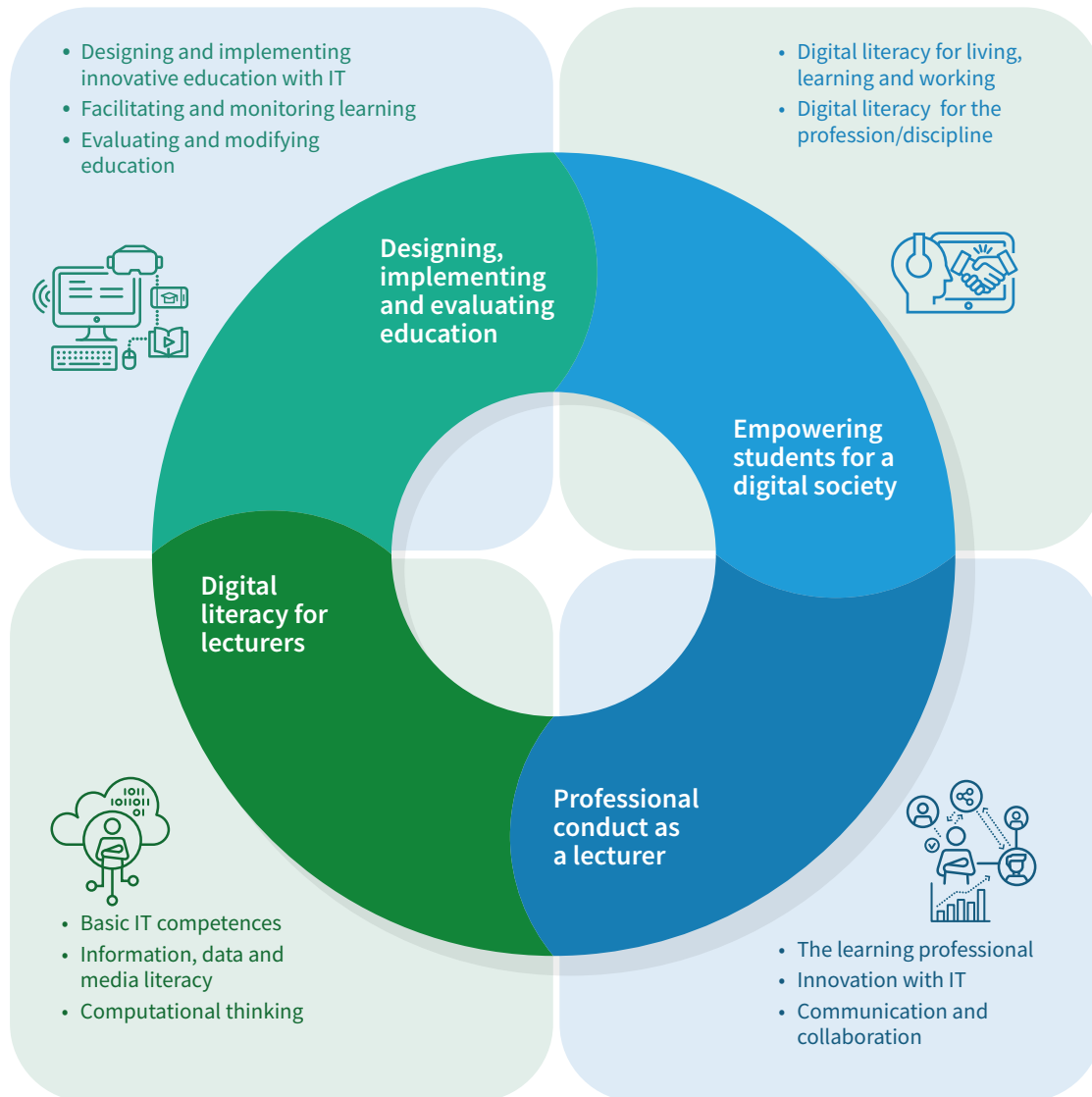


Figure 1. Framework for Digital Competences of Lecturers in Higher (and Vocational) Education (Tondeur et al., 2023; Uerz et al., 2021).

education not only from their own concept of teaching and learning with technology, but also from a societal perspective;

- a teacher at the senior level is expected to act in cocreation with the professional field to contribute to digital innovation in that professional field, more than a teacher at the basic level;
- a teacher at the senior level is expected to reflect on education at the level of the curriculum and to act accordingly;
- when using or incorporating new technology, the architectural level is also considered (systems and

applications in cohesion). This means that a teacher at the senior level sees the interrelationship of applications and can interpret their consequences. This involves a proactive attitude;

- a teacher at the senior level is expected to be able to guide other colleagues in the area of educational innovation with technology.

In the following chapters, we address the competences and behavioural indicators for each dimension.

1. Designing, implementing and evaluating education



The first dimension of the framework addresses the competences teachers need to design, implement and evaluate education to facilitate and monitor students' learning processes. During this process, it is key that teachers purposefully apply the potential of technology to improve or facilitate learning.

1.1. Designing and implementing innovative education with IT

Competences

1. Teachers are able to design innovative education that is consistent with their own concept of teaching and learning using technology and with the institution's educational vision;
2. Teachers are able to design and implement innovative education that makes use of technology to improve students' ownership of their learning process and respond to the individual needs of students;
3. Teachers know how to support, combine and coordinate the learning process in a variety of learning environments (e.g. face-to-face, online and in the workplace);
4. Teachers are able to take the well-being of students and inclusion into account in digital learning processes;
5. Teachers are able to select, modify, organise and create digital resources and learning materials.

Behavioural indicators basic level	Behavioural indicators senior level
<p>Teachers:</p> <ul style="list-style-type: none"> • use their personal practice-informed and theory-informed concepts of learning to shape their technology enhanced education; • know how to apply educational design principles within the context of technology enhanced learning arrangements; • work together with colleagues and/or students to create innovative technology enhanced learning packages within the context of their institution, using technology to add value; • justify design choices using their vision for teaching and learning, the learning goals, the students, the broader context and how the design fits into the curriculum; • explain design choices and the corresponding selection of digital tools; • select digital tools and use them to cater to different students' needs; • take the student's needs into account in their design (including cognitive load, basic IT competences, age); • ensure that the educational design and selected (digital) tools comply with accessibility regulations; • take the consistency between the learning process and learning environments into account within the design; • measure their design against usability requirements (logical, consistent, compliant with standards, no redundant user behaviour and easy to understand) when designing education; • select digital tools and apply them to align with learning goals, learning process/pedagogy, content and assessment (in accordance with TPACK); • regularly create and combine digital content, including open educational resources. 	<p>Teachers:</p> <ul style="list-style-type: none"> • ensures the micro-meso-macro consistency of the designed technology-rich educational practices, has an overview of the system of actors and factors involved, how they influence each other and how they can be influenced; • when designing, implementing and evaluating innovative education with technology, see the cohesion and sequence of activities across the grades; • use different design methods, make a conscious choice and substantiate it; • design technology-rich learning arrangements that are inclusive and prevent or reduce inequality of educational opportunities; • make a substantiated design of future-oriented education with technology based on pedagogical goals, content, their own vision, the team's vision and the institution's vision for teaching and learning and the broader context; • take students' learning needs into account in the design of education and give them agency where possible; • integrate fostering students' digital literacy into the design; • redesign innovative educational practices using technology, while consciously choosing the degree of educational transformation; • guide colleagues in designing technology-rich learning arrangements.

1.2. Facilitating and monitoring learning

Competences

1. Teachers are able to monitor and support the students' learning process using formative and summative assessment, making effective use of technology;
2. Teachers are able to use technology to collect, analyse and report on student data, to understand and improve the students' learning process;
3. Teachers are able to use technology to provide timely and personalised supervision and support.

Behavioural indicators basic level

Teachers:

- select digital tools and use them to facilitate collaborative learning, including peer feedback;
- select digital tools and use them to facilitate students to learn independently with and through technology;
- use data from several sources as well as data they collect themselves to enhance their students' opportunities for self-regulated learning;
- know the potential of using algorithms and artificial intelligence to monitor and support student learning;
- select digital tools and use data from several sources as well as self-collected data to:
 - establish the starting points and developmental needs of students;
 - monitor and evaluate learning processes;
 - provide students with feedback;
 - determine next steps.

Behavioural indicators senior level

Teachers:

- know and have an understanding of the process of monitoring learning outcomes using technology regarding:
 - the quality of information gathering;
 - the quality of (their own) analyses of learning outcomes;
 - identifying the consequences of the results of the analyses for the learning process.
- offer students customised options in a well-considered, data-based manner regarding the use of technology for learning;
- support students in regulating their own learning processes while using digital tools;
- formulate functional criteria regarding (digital) student monitoring systems and learning analytics based on their own vision, the team's vision and the institution's vision for teaching and learning;
- guide colleagues in facilitating and monitoring student learning with the help of technology.

1.3. Evaluating and modifying education

Competences

1. Teachers are able to evaluate and optimise their design for innovative education, making effective use of IT;
2. Teachers are able to reflect on the benefits of implementing IT in educational processes and modify its use accordingly;
3. Teachers are able to consider their own digital pedagogical-didactic conduct and adapt this to individual, institutional and societal needs.

Behavioural indicators basic level

Teachers:

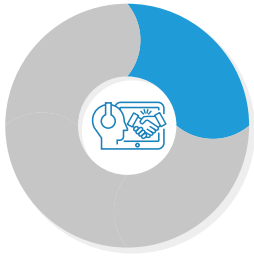
- decide how to organize their education on the basis of data on students' learning and development processes;
- evaluate how technology has contributed towards achieving the goals of the learning activity and deliberately select different (digital) tools if needed;
- are aware of (peer coaching) methods that allow teachers to collectively reflect on their own technology-supported pedagogical practice;
- reflect on their technology-supported pedagogical practice and identify follow-up steps to improve this practice;
- are aware of current developments in their own institution, in society, and the profession/discipline for which students are educated, specifically regarding digitization, and apply this to their own pedagogical practice.

Behavioural indicators senior level

Teachers:

- make decisions about the curriculum design based on data, recent research, developments in the field and ethical issues, such as the changing relationship between humans and technology, equity and inclusion, big data;
- evaluate teaching and learning processes at curriculum level using data and formulate appropriate recommendations for curriculum development;
- evaluate the quality of education (or educational design) based on professional values, institutional guidelines and societal developments and adjust their teaching (or educational design) accordingly;
- oversee the contribution of technology to the cohesive set of learning activities at curriculum level, adapt their own digital pedagogical behaviour accordingly and choose appropriate digital tools;
- guide colleagues in evaluating and adjusting their teaching with the help of technology.

2. Empowering students for a digital society



The rapid changes taking place in society and the job market, and the accompanying technological developments, require students to acquire new digital competences, both as citizens and as future employees. Teachers play a role in the development of students' digital literacy for living, learning and working. Moreover, teachers can be expected to pay attention to digital competences specific to the profession or discipline at hand.

2.1. Digital literacy for living, learning and working

Competences

1. Teachers are able to develop and implement learning activities to empower students' digital literacy;
2. Teachers are able to guide students in making rational use of the internet and social media;
3. Teachers are able to empower students to effectively manage and protect personal data and learning analytics;
4. Teachers are able to guide students in the regulation and monitoring of their own learning process using IT.

Behavioural indicators basic level	Behavioural indicators senior level
<p>Teachers:</p> <ul style="list-style-type: none"> • are aware of (the differences in) students' digital literacy; • design and carry out learning activities that allow students to create with technology and use technology to solve problems; • pay attention to the possibilities and difficulties that students might encounter when interacting with technology; • act as role models when it comes to digital literacy for living, learning and working; • design and carry out learning activities to: <ul style="list-style-type: none"> – teach students to familiarize themselves with new digital tools which facilitate living, learning and working; – teach students to purposefully and systemically search and process information, as well as assessing the reliability of both the information and its source; – enable students to develop the required media skills; – teach students to discuss the added value and risks of artificial intelligence, internet and social media; – foster students' data literacy; – familiarize students with privacy laws and regulations pertaining to data and online information (GDPR); – foster students' computational thinking skills. • help students to: <ul style="list-style-type: none"> – safely, legally and ethically responsibly use technology; – protect intellectual property rights; – manage and protect their personal and learner data while being able to express why this is important. • support students to monitor and regulate their own learning processes through the use of technology. 	<p>Teachers:</p> <ul style="list-style-type: none"> • respond to differences in students' digital literacy in learning activities; • support students in taking agency in the development of their digital literacy for living, learning and working; • design learning activities to empower students in a mediatised society; • teach students how to use media techniques to develop their own online profile; • teach students how to deal with ethical issues regarding the collection and use of data, algorithms and artificial intelligence; • coach colleagues in fostering their students' digital literacy.

2.2. Digital literacy for the profession/discipline

Competences

1. Teachers are able to ensure that students are familiar with new technological developments in the profession/discipline;
2. Teachers are able to encourage students to actively contribute to technological innovations within the profession/discipline;
3. Teachers are able to help develop the digital communication skills of students to ensure continued employability.

Behavioural indicators basic level

Teachers:

- acquaint students with existing technologies within their future profession/discipline;
- join students in experimenting with new technologies within their future profession/discipline;
- encourage students to keep up to date with (technological) developments within the profession/discipline;
- encourage students to share (technological) developments within the profession/discipline with each other and their teacher;
- encourage students to experiment with technologies that are new to them;
- foster students' problem solving skills regarding the use of technology within the profession/discipline and familiarize them with applicable design models;
- guide students in managing their online profile;
- support students to develop their digital communication skills required for instance for online meetings and other digital means of communication.

Behavioural indicators senior level

Teachers:

- have an overview of the required digital literacy for the profession/discipline and can design and implement learning activities for this purpose;
- support students in developing competences for innovation and transformation (such as critical thinking, complex problem solving, creativity and social skills) aimed at using technology in the profession/discipline;
- coach colleagues in fostering their students' digital literacy for the profession/discipline.

3. Professional conduct as a lecturer



Teachers, being learning professionals, must continue to develop their skills and knowledge within the context of their profession and their own professional identity. Within the context of their education, they must be competent in educational innovation with technology. Moreover, it is important that they are able to communicate and collaborate with other professionals in this area.

3.1. The learning professional

Competences

1. Teachers are able to identify areas for personal professional development with regard to educational innovation with technology and to actively work on development in these areas;
2. Teachers are able to work with colleagues to develop a vision for innovative digital education and empowering students for a digital society that aligns with the institution’s vision;
3. Teachers are able to evaluate their own vision for innovative digital education and modify this based on research results, developments in society and educational practice.

Behavioural indicators basic level

Teachers:

- have a clear perspective on their own professionalisation needs regarding educational innovation with technology;
- seek out and regularly participate in professional development activities which address these needs;
- use technology to facilitate their professional development regarding teaching and learning with technology;
- share their professional learning process regarding teaching and learning with technology with others within the organization;
- create an environment that allows them to learn about technology and digital literacy from and with students;
- regularly interacts with colleagues about recent developments, recent research findings and experiences in the classroom regarding the educational use of technology and their relevance for the individual and collective vision for teaching and learning with education and digital literacy.

Behavioural indicators senior level

Teachers:

- use (international) networks for their own professional development regarding educational innovation with technology;
- inspire colleagues to explore or use the possibilities of educational innovation with technology;
- use their professional agency to realise educational innovation with technology;
- regularly seek out situations that give cause to reassess their own vision and beliefs and encourage others to do the same;
- motivate and coach colleagues in their professional development regarding educational innovation with technology.

3.2. Innovation with IT

Competences

1. Teachers are able to analyse and critically evaluate innovative digital education practice and implement it in their own teaching practice;
2. Teachers actively follow innovative digital education practice in their profession/discipline and are able to critically reflect on the benefits of this for their own teaching practice;
3. Teachers are able to actively follow and experiment with developments in educational innovation with technology and discuss these with colleagues.

Behavioural indicators basic level

Teachers:

- actively seek out innovative digital tools;
- use innovative digital tools to create contemporary education and address students' needs;
- inspire others or act as role models for leveraging the potential of technology;
- critically assess (innovative) technology enhanced educational practices on their merits for students, teachers and for their own educational practice;
- critically assess innovative technology enhanced practices within the students' future profession/discipline on their merits for students and their own educational practice;
- keep track of recent developments and research findings regarding (innovative) technology enhanced education;
- use good practices of technology enhanced educational innovation from home and abroad as inspiration;
- experiment with various current and innovative digital tools fitting their own educational practice;
- innovatively apply technology within the context of the organization through well-considered and evidence-informed experimentation with colleagues and/or students;
- select new pedagogical and/or educational technological tools and experiment with them in their own education;
- translate everyday use of technology to their educational practice;
- contribute to educational development within the institution through the evidence-informed design of teaching and learning while using technology.

Behavioural indicators senior level

Teachers:

- are regularly looking for latest developments, recent research results and best practices to innovate teaching with and about technology
- experiment with different, recent and innovative digital tools based on their expected added value for teaching and substantiate these expectations;
- use (international) sources to substantiate innovations and experiments;
- before implementation, consider the consequences of educational innovations with technology in terms of ethics (regarding autonomy, justice and humanity);
- consider the consequences of digital innovations in the profession/discipline in terms of ethics (regarding autonomy, justice and humanity);
- support colleagues in experimenting and keeping up to date with (innovative) educational practices with technology.

3.3. Communication and collaboration

Competences

1. Teachers are able to collaborate in the design and evaluation of innovative digital education;
2. Teachers are able to participate in professional online networks or communities to strengthen professional ties relating to educational innovation with technology;
3. Teachers are able to use technology for communication with students, the institution and others.

Behavioural indicators basic level

Teachers:

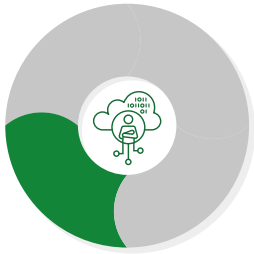
- collaborate with colleagues and/or students to innovatively design technology enhanced learning arrangements within the context of the institution;
- collaborate on innovative technology enhanced education in multi-disciplinary teams;
- actively share online learning materials and content with colleagues and re-use open educational resources;
- (co)create innovative technology enhanced education with students and others;
- share their acquired insights on teaching and learning with technology with others within and outside of the school;
- actively participate in discussions about education on various social media;
- have a social media profile and use this for personal branding.

Behavioural indicators senior level

Teachers:

- participate in (inter)national networks relating to educational innovation with technology;
- stimulate colleagues from inside and outside their own educational institution to actively think about educational innovation with technology;
- collaborate on educational innovation with technology beyond the borders of their own educational institution;
- support colleagues in communicating and collaborating with technology and with regard to educational innovation with technology.

4. Digital literacy for lecturers



In order to facilitate students’ development in digital literacy and to be able to design and implement future-proof education with technology, teachers themselves must also be digitally literate. Within the framework, these competences are subdivided into basic IT competences, information, media and data literacy and computational thinking.

4.1. Basic IT competences

Competences

1. Teachers are able to effectively implement technology in educational processes;
2. Teachers know which digital tools are available or should be available in a certain context, and how they impact the use of technology in an educational setting;
3. Teachers are able to select and quickly familiarise themselves with new digital tools, actively keep up with technological developments and experiment with new tools.

Behavioural indicators basic level

Teachers:

- explore multiple online environments focused on (facilitating) education like learning management systems and student tracking systems;
- keep up to date with recent, relevant technological developments;
- are curious about new digital tools;
- demonstrate having quickly familiarized themselves with various new digital tools;
- articulate pros and cons of existing digital facilities for teaching and learning;
- use the available online environments focused on education and understand how systems within them are connected;
- add new (pedagogical) digital tools to the existing digital infrastructure of the institution;
- apply digital tools to different groups of students or courses than they were originally intended for.

Behavioural indicators senior level

Teachers:

- substantiate which digital infrastructure is needed to realise the envisioned education, based on their beliefs for teaching and learning;
- formulate functional needs and requirements for the digital infrastructure based on educational scenarios;
- assess existing digital resources against the specified functional needs and requirements;
- functionally equip the education-oriented digital infrastructure based on their own needs as a teacher and those of their students;
- conceive how new digital tools from other contexts can be used in their own educational context;
- support colleagues in developing their own basic digital competences.

4.2. Information, data and media literacy

Competences

1. Teachers are able to find, analyse and interpret digital information and resources and evaluate their reliability;
2. Teachers take a critical approach to the use of internet and social media;
3. Teachers understand the rules regarding copyright and plagiarism, the different types of licences and can properly cite digital resources;
4. Teachers are able to actively, creatively and critically use and understand data, and manage and protect the personal data of students.

Behavioural indicators basic level

Teachers:

- assess the reliability and authenticity of information and data;
- organise sources of information and data efficiently;
- use various sources and channels of digital (learning) materials;
- assess the quality of information and data from students and colleagues;
- adequately use search engines, social media, and databases;
- compare information and data from different sources and synthesizes the retrieved information;
- are aware that search engines, social media and content platforms can use algorithms and artificial intelligence to tailor results to individual users;
- know what media strategies are used to reach and influence youth;
- know what media skills are needed in a mediatised society;
- realize that society requires new media skills;
- regularly mention the effects of increasing media use on society;
- actively use social media for their own professional development;
- use social media strategically and purposefully;
- are able to consider and manage their use of media and differentiate between media use for work and in private;
- assess their use of technology against ethical principles, institution-wide guidelines, laws and regulations;
- are aware of copyright regulations and have personal strategies to optimize the flow of information from various digital media and know how to systemically manage relevant information;
- responsibly deal with others' materials and are aware of associated regulations (references, copyright, privacy regulations);
- keep up to date with institutional guidelines and laws and regulations pertaining to data collection, data storage and data use (GDPR);
- use suitable tools for data collection, data storage and data use.

Behavioural indicators senior level

Teachers:

- know which search engines, social media and databases are suitable for which purpose and make conscious choices in this respect (also for international literature);
- systematically assess the reliability, authenticity and validity of sources of different levels and origins;
- know that retrieved information may consist of images, videos or sound recordings of events that did not really take place, but were generated by artificial intelligence (deep fakes);
- assess the suitability of the retrieved information and data for the target group (including reading and language level);
- have an up-to-date overview of the opportunities and challenges in the area of media (use) and relate this to their own vision for education;
- together with colleagues, shape the use of media in their own educational context and relate this to the institution's media guidelines, taking the well-being of students into account;
- consider the effect of their own media activities on the institution's reputation;
- apply institutional guidelines on information, data and media use to their own actions and encourage students to do the same;
- support colleagues in developing their own information, data and media literacies.

4.3. Computational thinking

Competences

1. Teachers are able to formulate a problem in their profession/discipline in such a way that it can be solved using technology;
2. Teachers are able to develop a solution to a problem using technology;
3. Teachers are able to apply the solution in their profession/discipline.

Behavioural indicators basic level

Teachers:

- can (re)formulate problems in such a way that a computer can effectively carry out the solution;
- can collect, analyse and visualize data to solve problems and issues and use digital tools to achieve this;
- can break a problem down into smaller parts (decomposition);
- can make problems less complex by omitting specific details and focusing on core aspects (abstraction);
- can describe the solution to problems and issues in separate steps (algorithms) and procedures;
- can use technology to run the solutions (algorithms and procedures) to problems (automation);
- can display the solution in the form of an existing model or process, or conduct an experiment based on an existing model or process;
- can systemically detect errors in algorithms and procedures (debugging).

Behavioural indicators senior level

Teachers:

- understand how technology can contribute to solving societal problems and complex problems in the profession/discipline;
- can apply computational thinking in conceiving solution paths for societal problems and complex problems in the profession/discipline;
- understand the possibilities, limitations, opportunities and risks of using artificial intelligence in problem solving;
- support colleagues in developing their own computational thinking skills.

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‘Tomorrow's learning is lifelong personalized learning in a technology-enabled social learning environment.’

iXperium Centre of Expertise Teaching and Learning with ICT

The iXperium Centre of Expertise Teaching and Learning with ICT is a network organisation centred around teaching and learning with ICT. The HAN research group Teaching & Learning with ICT is at the heart of this network, working together with a growing number of school boards and teacher training institutions from all over the Netherlands.

Thematic tracks

The programme of the iXperium is divided into three thematic tracks:

1. Learning with ICT as a tool, for personalised learning.
2. The organisation of personalised learning at micro, meso and macro level.
3. Learning with ICT as the goal, training digitally literate participants for the digital society.

Within these thematic tracks, we work on knowledge development, development in practice and in teacher education and on professional development of (future) teachers, teacher trainers and supervisors.

For more information, please visit:

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