MODEL FOR ASSESSING THE DIGITAL COMPETENCE OF STUDENTS

The model describes the components of digital competency at the end of basic school stages, upper secondary school and vocational school.

Component skill	Level 1 - stage 1 of basic school	Level 2 - stage 2 of basic school	Level 3 - stage 3 of basic school	Level 4 - upper secondary school and vocational school
1. Management of information				
1.1. Searching for and browsing of information - based on the goal, the students determine their need for information and choose appropriate methods for searching and browsing digital information				
	Students find the necessary sources of information by using a search engine and keywords, browse them and select (filter out) appropriate digital materials with the help of a tutor.	Students find the necessary information from different sources of information by applying various search methods: keyword search, ranking, filtering, tag cloud.	Students vary the search methods according to the objective, use alternative search methods where necessary, and justify the superiority of the chosen search method.	Students: 1) determine their information needs and find appropriate information for purposes related to personal development, learning, handling social and problem situations, research, etc.; 2) test, compare and design effective search methods which cover different publications and information systems.

1.2. Assessment of information - students collect and process digital information, identify important information and analyse and assess it in a critical manner.				
	Students structure the collected information by forming ranked lists and grouping information on the basis of predefined criteria with the help of a tutor.	Students: 1) find on the Internet digital material in various formats and, where necessary, copy it to a text file or presentation and process it according to the prescribed requirements; 2) explain the need to assess the discovered information in a critical manner, assess the objectivity of sources of information, and where necessary, find sources which provide an alternative viewpoint on the same topic, 3) distinguish facts from opinions.	Students: 1) use social bookmarks, categories and tags for marking and structuring sources of information they have created or found on the Internet; 2) critically assess the relevance, reliability and integrity of the information they found; 3) compare predefined sources of information on the web in terms of appropriateness, objectivity/bias and relevance.	Students: a) critically analyse different information, compare and use contextually appropriate discursive practices (e.g. social media, judicial practice, entertainment, communication between friends), respecting the applicable practices of communication; 2) explain the general mechanisms of functioning of the media industry, incl. the role of media on the labour market.

1.3. Saving and reproduction of information - students save digital information in the light of their goals, and structure and process the collected information with a view to its reproduction.				
	Students save and reproduce discovered information according to the requirements set by the tutor.	Students: 1) correctly refer to and reuse digital material retrieved from the Internet and other sources of information, refraining from plagiarism; 2) save the completed work in a predefined format and location (incl. web environment), find and reopen the saved file, save it using a different file name, copy files from one location to another, and compare file sizes with the available space on the data medium; 3) proficiently use the graphic user interface of the operation system (adjust window size, work in multiple windows, change views, sort files, search for whatever necessary).	Based on the objective, students structure and process digital materials created by them or others respecting the good practices of intellectual property protection and the licensing conditions set by the author.	Students: 1) save and manage digital materials in different web environments (incl. cloud environments) and physical devices by employing various classification systems to this end; 2) intentionally select the appropriate environment and solution (e.g. synchronising, backup copies, etc.) to store digital materials.

2. Communicating in digital environments				
2.1. Communication using digital devices				
	Students communicate with parents, fellow students and teachers using digital devices and applications according to their age and the agreed rules.	Students: 1) explain the advantages and setbacks of digital communication devices in a specific context and choose the most appropriate one; 2) add comments to a web site, participate in a discussion held by means of a web forum and mailing list respecting the generally accepted communication practices and the requirements set by the specific environment.	Students: 1) join the predefined digital communication environment, fill in the user profile and participate actively in a discussion; 2) choose the appropriate form, means and method of communication depending on the purpose and environment; 3) manage, delete, copy and file away different types of messages and discussions depending on the purpose.	Students describe the information environment, analyse it in a critical manner and function therein according to their goals and socially accepted communication ethics.
2.2. Sharing of information and content - students share with others the location and content of discovered information and respect the good practices of intellectual property protection.				

	Students share with others, according to prescribed requirements, the digital materials using the help of a tutor.	Students share information in web environments using various digital devices and respecting the requirements of the specific environment.	Students: 1) use the prescribed or self-selected web environment purposefully and safely (e.g. select a secure password, create a user profile, add materials); 2) participate in virtual networks and use the web environment for publishing digital materials in accordance with the good practices of intellectual property protection.	Students: 1) compare the advantages and setbacks of sharing digital materials (both from their own point of view and that of others); 2) analyse the value of shared information and its suitability for the target group.
2.3. Civil initiative on the web - students are involved and they involve others in community activities using ICT equipment and facilities.				
		Students purposefully use the school's educational information system and/or the e-learning environment.	Students purposefully use the information systems and e-services provided by local and central government bodies (e.g. citizens' portal, Estonian Education Information System (EHIS), document management system, ID card or mobile ID).	Students describe and purposefully use the opportunities provided by digital devices for participating in the civil society whilst respecting the socially accepted practices related to communication ethics.
2.4. Cooperation using digital technology - students use digital devices for teamwork and cooperative development of resources, digital materials and knowledge.				

	Students work with others in a predefined environment (e.g. digital communication or working offline with digital devices).	Students work with others in the form of teleworking and use, across certain projects, the digital devices and web environments designed for teamwork.	Students: 1) find and join on the Internet the required communities in the light of the learning objective; 2) where necessary, set up a new virtual community and create a web-based teamwork environment for that end; 3) create, in cooperation with other students, interactive digital materials (e.g. commenting of documents or resources, tags, supplementation of Wiki, tracing, etc.).	Students: 1) employ digital devices to apply their creativity, teamwork skills and initiative in various (innovative) projects; 2) use, based on the objective, new/different web-based teamwork services and their various functions.

2.5. Net etiquette - students apply behavioural standards and good practices in digital communication, and consider cultural characteristics and diversity while communicating.				
	Students apply the agreed behavioural standards in both private and public environments (e.g. digital communication on the web).	Students: 1) recognise the ethical principles of using and publishing information, appropriate behaviour, context and target group when engaging in digital communication; 2) explain the potential consequences of unethical behaviour in digital communication.	Students: 1) respect the legal provisions on using and publishing information in the course of digital communication; 2) explain the importance of recognising and respecting cultural diversity in digital communication (e.g. different ethnic nationalities, generations, views, choices, origin, etc.).	Students: 1) accept and value diversity and apply suitable strategies for detecting inappropriate behaviour; 2) formulate reasoned (well-argued/justified) views on ethical issues related to technological development and the use of technology.
2.6. Management of digital identity - students develop and manage their digital identity and monitor their digital footprint.				
	Students describe the opportunities and threats related to digital identity.	Students: 1) develop, manage and protect (recognise the consequences) their digital identity and digital footprint; 2) do not use the identity of other persons.	Students use their digital identity safely and ethically, and exercise caution when communicating digitally with strangers (fake identity).	Depending on the context and objective, students make use of different possibilities to manifest their identity and personal characteristics using digital devices.

3. Creation of content				
3.1. Creation of digital content - students create digital content in various formats, and modify and develop content created by others.				
	Students create and format digital materials (e.g. creative works) with the help of a tutor.	Students: 1) create, format, save and, where necessary, print digital materials in predefined formats (incl. synopsis, poster, announcement, presentation) respecting the applicable criteria; 2) copy photos, videos and audio recordings on a data medium (both physical and virtual); 3) reflect on their learning experience in an appropriate digital environment.	Students: 1) are able to handle creative work (incl. data collection, processing and analysis, and presentation of results) using a computer; 2) choose the appropriate software for collecting and processing data and presenting their research results; 3) create digital portfolios to present their learning outcomes.	Students create various types of new digital content, according to the objective, using different platforms and environments (e.g. short film, web page presenting a profession and/or hobby, etc.).
3.2. Creation of new knowledge - students modify and integrate the available digital materials to create new knowledge.				
	Where necessary, students modify digital materials (e.g. text document) created by them or others.	Students: 1) use the available open digital study materials to create new knowledge; 2) take into account the digital amendment proposals made by others (e.g. comments, tracking changes, etc.).	Students reuse and integrate available digital materials when presenting new knowledge.	Students: 1) justify the selection of appropriate methods and tools for modifying digital materials; 2) use a domain-specific software application for learning.

3.3. Copyright and licences - students respect the principles related to intellectual property when creating digital content and using content created by others.				
	Students: 1) recognise that some digital material available on the Internet may be protected by copyright; 2) where possible, ask the author's permission to make changes, using the help of a tutor.	When creating new content, students respect the goof practices of copyright and intellectual property protection, and any licence conditions.	Students: 1) duly format the creative work and correctly refer to sources within the text; 2) respect the good copyright practices for content created by them as well as others.	Students: 1) recognise in their learning process and daily routines the various kinds of licence conditions applicable to programs and applications; 2) where necessary, add the appropriate licence to the digital materials they have created.
3.4. Programming - students use programming language to develop simple programs.				
	Students use a visual programming language to develop simple programs which contain variables, cycles, conditional sentences and procedures.	Students use a visual programming language to develop robot control software, an interactive game operated in a browser, or a mobile device application.	Students contribute to the software development project implemented under the cross-cutting topic "Technology and innovation" in the capacity of team members (programmer, designer, tester, analyst or team leader).	Students develop computer programs using a modern programming language and development environment.

4. Safety				
4.1. Protection of devices - students take safety and security measures to avoid physical and virtual risks.				
	Students: 1) use digital devices prudently at home and at school; 2) list the risks related to using digital devices; 3) ask the tutor for help where necessary.	Students: 1) protect their digital devices by implementing security measures (e.g. anti-virus and anti-malware programs, tracking applications, etc.) 2) connect and integrate various external equipment with digital devices (e.g. memory stick, mouse, printer, external hard drive); 3) follow the rules for disconnecting digital devices.	Students: 1) use digital technology purposefully and with due respect to the risks; 2) take safety measures, if the device is at risk (e.g. infected with a virus, immersed in water).	Students analyse the general rules for implementing security measures in public space and describe the required action to be taken in the case that the said rules are violated.
4.2. Protection of personal data - students recognise the privacy of other individuals and common terms of use in exercising their digital activities, and protect their personal data and themselves from Internet fraud, threats and cyberbullying.				
	Students explain in their own words why delicate information should not be disclosed (about themselves or others) in a public environment.	Students: 1) create and use strong passwords to protect their digital identity from misuse in private and public environments; 2) do not disclose delicate information about themselves or others in a public environment.	Students distinguish between the security levels of digital environments (e.g. http vs. https, security certificates) and consider them whilst using various web environments.	Students analyse and formulate reasoned positions on the impact of technological innovations on our working environment in the past, present and future.

4.3. Health protection - students avoid health risks arising from the use of digital technology and digital information.				
	Students use digital technology in a healthy manner (choose the correct sitting position, observe the duration and place of using the device, adjust the device according to light conditions to protect their eyesight).	Students explain the potential health risks of misusing digital device (addiction, joint and posture problems, deterioration of eyesight) and avoid risks related to digital technology in their daily routines - practising physical exercises (for eyes, wrists, etc.).	Students analyse the impact of technology on daily life and the environment, and strike a balance between the use of digital and physical environments.	Students: 1) assess health risks related to using digital devices (from ergonomic aspects to technology addiction); 2) draw conclusions as to how the digital environment could make life better or worse based on how it is used and which rules are followed.
4.4. Environmental protection - students acknowledge the environmental impact of digital technology.				
	Students give examples and associate technology use with environmental protection.	Students: 1) list the positive and negative environmental effects of using digital technology; 2) use digital technology in an energy- and resource-efficient manner.	Students: 1) analyse the positive and negative environmental effects of the development of digital technology (e.g. on the natural, economic, cultural environment, etc.); 2) make reasoned decisions when choosing digital technologies (e.g. when creating and consuming information, buying or repairing equipment).	Students formulate their position in a reasoned manner and provide an opinion on environmental issues related to the use of digital technology (e.g. opportunities, problems).

5. Solving of problems				
5.1. Solving of technical problems - students use troubleshooting techniques to identify technical problems and find possible solutions (from simple troubleshooting to more complex problems).				
	If a digital device or application fails to operate, students seek assistance and describe the encountered problem.	Students independently (if necessary, according to instructions) identify and solve simpler problems which occur when digital device, programs or applications fail to operate.	Students: 1) find information and assistance for solving technical problems and for troubleshooting, using predefined sources; 2) find alternative solutions in the course of problem solving.	Students: 1) independently find information and assistance for solving technical problems and for troubleshooting, using various sources; 2) guide others in clearing simpler technical problems and finding solutions.
5.2. Identifying needs and finding the corresponding technological solutions - students select and critically assess the appropriate technological possibilities and digital solutions according to their needs.				
	Students select the appropriate digital solution for solving the provided tasks with the help of a tutor.	Students: 1) assess the suitability of the selected digital device or application in view of its functionality; 2) recommend digital devices to the group in the course of teamwork exercises and work with the device chosen by the group.	Students: 1) use purposefully and creatively the possibilities offered by digital technology to solve real-life problems and making their learning process more effective; 2) describe the functioning and development trends of technology in various areas of life.	Students analyse, based on the needs, the effectiveness and impact of using various digital technologies, and make decisions and recommendations based on such analysis.

5.3. Innovation and creative use of technology - students creatively use technology for expressing themselves and finding innovative solutions to problems.				
	Students use digital technologies for creative purposes subject to teacher's guidance.	Students use digital devices purposefully to present or solve a task which interests them or others.	Students: 1) use digital devices for solving problems and initiate teamwork for developing creative and innovative solutions; 2) use digital devices to solve issues arising in various fields of daily life which require mathematical and logical thinking; 3) use the possibilities of digital technology for expressing themselves and creating knowledge.	Students: 1) participate in an innovative development project in cooperation with fellow students and/or a technology company; 2) explain the reciprocal effects and interconnections of technological, economic, social and cultural innovation.
5.4. Identifying the gaps in digital competence - students are up to speed with the latest developments in digital technology, consistently identify the gaps in their digital competence, develop themselves and support others in building digital competence.				
	Students describe in their own words the level of their digital competence and development possibilities using the help of a tutor.	Students: 1) control their learning process in the field of digital technology with the help of a tutor; 2) are up to speed with the latest developments in digital technology in line with their needs.	Students: 1) analyse the digital competencies necessary for attaining their goals; 2) identify the gaps in their digital competence and envisage the required action to eliminate such gaps.	Students: 1) assess and reflect on their digital competence and experience in using digital technology, and knowingly plan digital competence building; 2) advise and support others in digital competence building.