

Digital Competence Framework for Austria

DigComp 2.2 AT



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Preface

The federal government proclaimed 2019 as „Year of Digitalisation“, thus actively shapes the biggest and most far-reaching transformation since the Industrial Revolution. We are in the midst of a transition into an interconnected era, society and economy. The tools and media that accompany us at work, in everyday life and in our leisure time are developing at a rapid pace. We wish to take everyone into the digital age in Austria with us.

In an EU-wide comparison of digital skills among citizens, we rank in seventh place – there is a lack of specialists in the field of information and communication technology and, moreover, people over 60 are hesitant to use new technologies. A turnaround is highly necessary here – a modern society needs digitally skilled citizens.

As patron and initiator of fit4internet, I support the development of digital skills as the fourth basic skill besides reading, writing and arithmetic. In 2019, all citizens will have the opportunity to conduct a free online check at fit4internet.at to assess their own digital competence. This allows identifying one's own strengths as well as potentials and provides a basis for further personal growth by advising suitable educational offers.

As a quality standard, we are introducing the „Digital Competence Framework for Austria - DigComp 2.2 AT“, which is based on the „DigComp“ reference framework of the European Commission. As an instrument for assessing and improving digital competence, the „Digital Competence Framework for Austria“ is oriented towards social, economic and technical developments. Courses classified in the DigComp 2.2 AT framework enable the development of digital everyday competence. The acquired qualification is the basis for each and every one of us to progress in professional life and to deal securely with digital technologies and media – thus an immense asset in our modern and interconnected world.



Federal Minister
Margarete Schramböck

A handwritten signature in black ink, which appears to read 'M. Schramböck'.

Dr. Margarete Schramböck
Federal Minister for Digital and Economic Affairs

Introduction

Media literacy is crucial for education. After all, language is the prerequisite for education, self-determination requires a sovereign approach to media, and being able to understand oneself as educated requires the ability to express oneself in public. As the awareness of society expands concerning digitalisation, education in this field is becoming a task for an increasing number of people. Moreover, with the dynamic development of markets based on data resources and the increasing market volume for databased products in most industries, the competence to deal with knowledge, to master information processes and to creatively deal with knowledge is becoming an essential success factor in many markets.

In both cases, the central figure is the individual who appreciates unrestricted knowledge, who recognizes the possibilities inherent in knowledge and who also uses those possibilities creatively and profitably.

The Digital Competence Framework for Austria - DigComp 2.2 AT is a meaningful advancement of the necessary link between vocational education, training in information technology and media competence transfer, for example through the aspects of shaping digital identity or the required development of programming and modelling skills. In this context, digital basic education for all citizens combines general and vocational education. This corresponds to the dynamics of digitalisation in business and society, since general education is the best answer to current upbringing for the future life in a dynamic society.

The establishment of the Digital Competence Framework for Austria - DigComp 2.2 AT in the context of digital literacy is a complex project involving schools, open youth work and adult education. The tasks range from setting a focus in pedagogical studies to research and development projects for the establishment of practical answers and the implementation of numerous initiatives to linking these processes through a coordination office. Its tasks should also include communication with the public, as the public is the goal and simultaneously, the means of digital basic education.



Univ. Prof. Dr. Christian Swertz, MA

1 DigComp 2.2 AT Overview

The Digital Competence Framework for Austria - DigComp 2.2 AT at a glance

The competence model DigComp 2.2 AT is the Austrian version of the European DigComp 2.1 reference framework outlining the field of digital competences of citizens in a general and comprehensive way. Compared to the European Reference Framework in English, the model adapted for Austria was translated and slightly extended, where relevant.

Dimensions of competence areas and competences

The Digital Competence Framework for Austria - DigComp 2.2 AT is multidimensional.

On the one hand, the framework divides the field of digital competences into six areas and describes these detailed in 25 further individual competences. In order to maintain coherence with the numbering of the European model, the competence area „Foundations and Access“, which precedes the Austrian model, was given the order number 0.



Digital competence in everyday family life - Selfie of a family

- **0. Foundations and access (DigComp 2.2 AT)**
 - 0.1 Understanding the concepts of digitalisation
 - 0.2 Handling digital devices
 - 0.3. Using and providing inclusive forms of access to digital content
- **1. Information and data literacy**
 - 1.1 Browsing, searching and filtering data, information and digital content
 - 1.2 Critically evaluating and interpreting data, information and digital content
 - 1.3 Managing data, information and digital content
- **2. Communication and collaboration**
 - 2.1 Interacting through digital technologies
 - 2.2 Using digital technologies to share data and information and to cooperate (DigComp 2.2 AT)
 - 2.3 Using digital technologies for social participation
 - 2.4 Carrying out purchases and sales (DigComp 2.2 AT)
 - 2.5 Using appropriate forms of expression
 - 2.6 Managing digital identity
- **3. Digital content creation**
 - 3.1 Developing digital content
 - 3.2 Integrating and re-elaborating digital content
 - 3.3 Copyright and licences
 - 3.4 Programming and automating processes
- **4. Safety**
 - 4.1 Protecting devices
 - 4.2 Protecting personal data and privacy
 - 4.3 Protecting health and well-being
 - 4.4 Protecting oneself and others against fraud and consumer rights abuse (DigComp 2.2 AT)
 - 4.5 Protecting the environment
- **5. Problem solving and continuing learning**
(„Continue learning“ – DigComp 2.2 AT)
 - 5.1 Solving technical problems
 - 5.2 Identifying needs and technological responses
 - 5.3 Creatively using digital technologies
 - 5.4 Identifying digital competence gaps

Dimension proficiency levels

On the other hand, the framework describes the development and form of these competences on eight levels. This level structure allows the DigComp competence framework to correlate with the European Qualification Framework EQF, also consisting of eight levels, or the National Qualification Framework NQF¹, which derives from it and comprises eight levels as well.

Competence	Level
Foundation	Level 1
	Level 2
Intermediate	Level 3
	Level 4
Advanced	Level 5
	Level 6
Highly specialised	Level 7
	Level 8

Reference frameworks are models of reality that need to be receptive to future developments, as both digital technologies and their social context continue to evolve very dynamically.

The field of digital competences described by the DigComp competence framework can be imagined as a three-dimensional model (bottom left figure). The competences of humans in the light of digitisation, however, cannot be neatly „put into a cube“ in reality. In another model, the field of digital competences may resemble a tree (figure below right), which is still somewhat manageable in the area of the trunk (levels 1 to 4), but also grows rapidly in all directions and thus „into the blue“ after levels 5.



Figure: Two ways of looking at digital competencies - as a three-dimensional cube model and as a tree with a trunk and branching branches

Reference frameworks or competence models are therefore helpful, necessary in order to gain understanding, orientation, imagination, conceptuality, discourse capabilities and obtain an overview. They support the assessment and description of personal skills and reveal strengths and areas that can be promoted. They present the basis for the development of competence checks and structure educational offers, which makes them easier to find.

However, all competence models can only describe reality to a limited extent. Due to the dynamics of developments in digitisation already mentioned, the Digital Competence Framework for Austria - DigComp 2.2 AT (as well as the European DigComp 2.1) is a snapshot that will be adapted at an appropriate time.

2 DigComp 2.2 AT

Context - Details - Outlook

Digital Competence - A retrospective and panoramic view

Over the last two decades, the awareness about the need for lifelong learning has developed considerably. The general extension of educational pathways and the likelihood of not being able to pursue the profession once learned in adolescence until retirement, are only two of many phenomena expressing this dynamic process. This retrospective and panoramic view both aims at deepening our understanding of the „phenomenon of digital competences“ and providing an impression of the ongoing changes in this field. After all, every competency model reflects the questions and understandings of the time in which it has been created and have to be developed continuously in order not to get outdated.

Today and in the near future, digitalisation is one of the main drivers of development. In 2006, for example, the European Commission included digital literacy in its recommendation 2006/962/EC² on key competences for lifelong learning.

Digital competences in
professional life



EU key competences

In this recommendation, eight key competences important for each individual in a knowledge-based society were defined for the first time.

Since then, competency requirements have changed. The European Commission, therefore, carried out a partly public consultation process in 2016 and 2017, which resulted in the publication of [Recommendation 2018/0008³](#) on key competences for lifelong learning at the beginning of 2018. It complements, updates and replaces the document from 2006.

The following table compares these two versions of the key competence model. Despite many common features, additions, shifts, extensions and further emphasis are to be noted. With regards to digitisation, the difference made between IT competence (now explicitly shown in point 3) and digital competence (point 4) is particularly remarkable.

	EU Key Competences (2006)	EU Key Competences (2018)
1.	Communicating in a mother tongue	Literacy competence
2.	Communicating in a foreign language	Multilingual competence
3.	Mathematical, scientific and technological competence	Mathematical competence and competence in science, technology and engineering
4.	Digital competence	Digital competence
5.	Learning to learn	Personal, social and learning to learn competence
6.	Social and civic competences	Citizenship competence
7.	Sense of initiative and entrepreneurship	Entrepreneurship competence
8.	Cultural awareness and expression	Cultural awareness and expression competence

The revised catalogue of competencies was complemented by further recommendations of the European Commission due to its implementation. These are its core statements:

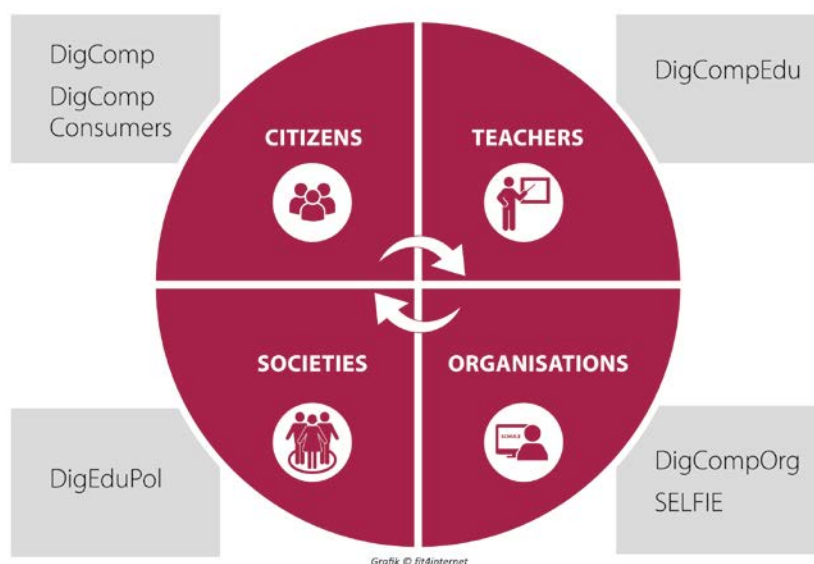
1. the right to high quality and inclusive education, training and lifelong learning,
2. support in the development of key competences, in particular literacy, numeracy and basic digital skills,
3. facilitation of the acquisition of key competences by interdisciplinary and multi-faceted cooperation between all participants and institutions and by developing appropriate tools and assistance,
4. consideration of the 17 goals for sustainable development of the United Nations (Sustainable Development Agenda 2030)⁴,
5. report, documentation and linking of experiences, tools and progress.

Aspects of digitalisation and its effects and consequences receive a lot of attention in the recommendation. Further work on certain competence areas of the model – for example digital competences – is explicitly welcomed.

European DigComp reference framework - the pathway from Version 1.0 to 2.1

The Joint Research Center of the European Commission launched its research program „on Learning and Skills for the Digital Era“ 2005 with more than 20 so far larger studies as well as more than 100 different publications. It was under the aegis of several DGs several and several related reference frames have been set up and developed further - namely in the areas of citizens, educators, organizations and society.

Selected projects and competence models of the Joint Research Centre JRC of the European Commission.



Graphic: Own presentation based on the following sources: <https://www.slideshare.net/vuorikari/online-chat-tools-for-digitilising-education-institutions> or <https://ec.europa.eu/jrc/en/research-topic/learning-and-skills>; accessed: 11.1.2019). In the area of digital competences, research was carried out: DigComp (digital competences for citizens); DigComp-Consumers (digital competences for consumers); DigCompEdu (Digital competences for teachers); DigCompOrg (Framework for digitally competent educational institutions); SELFIE (Self-Assessment-Tool for schools - support for learning in the digital age); DigEduPol (Digital Education Policies in Europe and Beyond: Key Design Principles for More Effective Policies)

A DigComp reference framework version 1.0 was released in 2013. Version 2.0 followed in 2016, version 2.1 build the basis for the Austrian model DigComp 2.2 AT framework and was released in 2017. In terms of content, the once chosen structure – as it was the case with the eight EU key competences – has proved its worth. The changes between 2013 and 2017 reflect certain developments such as the increased perception of „digitalisation“ as an overall term for the described development and the awareness-raising for the areas „data“ and „privacy“.

DigComp 1.0 (2013)	DigComp 2.1 (2017)
1. Information 1.1 Browsing, searching and filtering information 1.2 Evaluating Information 1.3 Storing and retrieving information	1. Information and data literacy 1.1 Browsing, searching and filtering data, information and digital content 1.2 Evaluating data, information and digital content 1.3 Managing data, information and digital content
2. Communication 2.1 Interacting through technologies 2.2 Sharing information and content 2.3 Engaging in online citizenship 2.4 Collaborating through digital channels 2.5 Netiquette 2.6 Managing digital identity	2. Communication and collaboration 2.1 Interacting through digital technologies 2.2 Sharing through digital technologies 2.3 Engaging in citizenship through digital technologies 2.4 Collaborating through digital technologies 2.5 Netiquette 2.6 Managing digital identity
3. Content creation 3.1 Developing content 3.2 Integrating and re-elaborating 3.3 Copyright and licences 3.4 Programming	3. Digital content creation 3.1 Developing digital content 3.2 Integrating and reelaborating digital content 3.3 Copyright and licences 3.4 Programming
4. Safety 4.1 Protecting devices 4.2 Protecting personal data 4.3 Protecting health 4.4 Protecting the environment	4. Safety 4.1 Protecting devices 4.2 Protecting personal data and privacy 4.3 Protecting health and well-being 4.4 Protecting the environment
5. Problem solving 5.1 Solving technical problems 5.2 Identifying needs and technological responses 5.3 Innovating and creatively using technology 5.4 Identifying digital competence gaps	5. Problem solving 5.1 Solving technical problems 5.2 Identifying needs and technological responses 5.3 Innovation and creatively using digital technologies 5.4 Identifying digital competence gaps

The main difference between the two versions 1.0 and 2.1 does not concern the catalogue of competencies, but undoubtedly involves the development of a three-stage model...

DigComp 1.0: A – Foundation | B – Intermediate | C – Advanced

...to an eight-step development scale.

DigComp 2.1: Foundation Levels 1&2 | Intermediate Levels 3&4 | Advanced Levels 5&6
| Highly specialised Levels 7&8

The DigComp competence model therefore is based on the European Qualifications Framework EQF, which also comprises eight levels. The following description of the DigComp 2.2 AT Competence Framework outlines these eight levels in more detail.

DigComp implementation experiences

With the publication „DigComp into Action. Get Inspired Make It Happen. A user guide to the European Digital Competence Framework“ in 2018, the European Commission released a detailed and differentiated report on experiences concerning the implementation of the DigComp reference framework. A research of the context - commissioned by the Federal Ministry for Digital and Economic Affairs in the summer of 2018 - which also takes into account numerous other experiences, especially in Europe, came to the following conclusions:

- The questions, what digitalisation actually means, what it can do and what kind of development it will trigger, are still unanswered. Digitalisation is „work in progress“ and „history in progress“.
- Many people are particularly concerned about the question of social cohesion (inclusion), but digital transformation also calls for appropriate education, relevant research and development, the establishment of institutions as well as courageous interventions of the associated opportunities.
- The DigComp 2.1 reference framework is one of many measures to capture the demands and opportunities digitalisation holds for citizens. Although this reference framework should be considered as work in progress, it has provided institutions and companies with relevant input to design and deploy (digital) instruments to measure and develop competences.
- The effectiveness of these instruments and certificates strongly depends on the target group and their context of application.
- The openness and dynamics of the development suggest a network of initiatives, companies and institutions that are, responsible and active in the field of digitalisation. Therefore, a central support institution that actively promotes communication and cohesion is essential.
- An open approach, towards mistakes (understood as learning opportunities) and a followed exchange about these errors, is crucial.

In particular, expertise from Denmark and Estonia - both considered „digital champions“ - indicates the need for an adapted, flexible „translation“ of any framework into its respective context as well as the need for a special focus on the institutions, communities, and people involved.

Milestones along the Austrian path: DigiComp; Digital Roadmap; Green Papers of the Federal Council; Mandatory course Digital Basic Education; Digital Austria

It would go far beyond the scope of this publication, to trace a complete outline of the Development and understanding of digital competences in Austria during the last decades . Moreover, this path has not been searched, followed and developed just through institutional or state impulses, but to the highest degree through a wealth informal initiatives in the fields of economy, science, technology and civil society. This „history in progress“ would have to be researched and written first. Some important milestones of the „institutional Austria“ should provide orientation and an overview at this point.



Digital competence in professional life - freelancer at work

Since 2006: **digi.komp** - Digital Competences. IT education

For more than 10 years, the so-called „digi.komp initiative“ has been promoted within the Austrian education system. Initially voluntarily implemented at schools and universities, digital literacy is now integrated systematically into syllabuses, curricula and binding requirements.

- **digi.komp4** - a model of digital competences and implementation examples for elementary schools (4 refers to the highest, namely the 4th grade of elementary school).
- **digi.komp8** - digital competences and implementation examples for secondary education 1, which ends in 8th grade. (Now replaced by the new subject „mandatory exercise digital basic education“.
- **digi.komp12** - digital competencies and implementation examples for the upper level of grammar schools up to 12th grade (some vocational schools already provide explicit and detailed curricula in the field of computer science for decades).
- **digi.kompP** - Digital competencies for teachers. This model is currently being integrated into the curriculum of education and training of teachers.

2016: Digital Roadmap Austria⁵

Opportunities and potentials, but also challenges and threats caused by digitisation affect society and the economy. Therefore, it is necessary to seek solutions and development paths for the technological changes driven by digitalisation.

In 2016, the Austrian Federal Government developed and published the Digital Roadmap as a guide for the digital future – in an extensive and partly public consultation process. The Digital Roadmap comprises twelve fields of action and measures: (1) Education (2) Infrastructure (3) Research and innovation (4) Business (5) Work and jobs (6) Health, care and social affairs (7) Environment, energy, agriculture and climate protection (8) Mobility and transport (9) Media, civil courage and culture (10) Integration and inclusion (11) Security, protection and trust (12) Politics and administration.

The Digital Roadmap takes into account general effects on society and resulting consequences of digitalisation for the first time.

2015-2018: Green Papers of the Federal Council

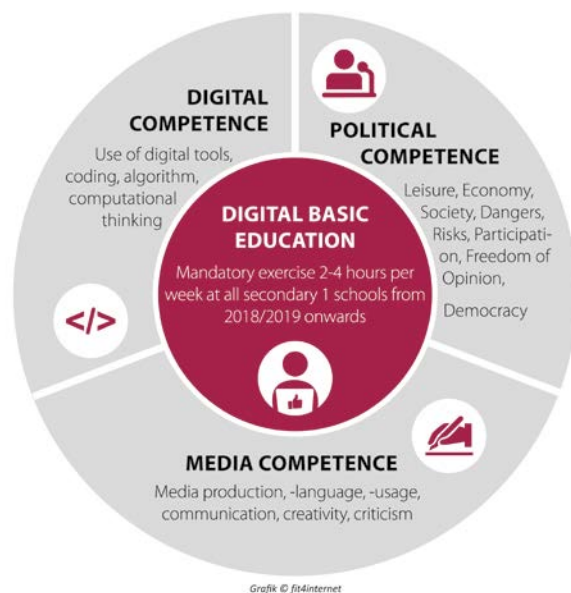
Already in 2015, the Federal Council has started to discuss the topics of digitalisation on a broad, also parliamentary level. Since then, the following Green Papers - always combined with expert opinions, public participation processes and parliamentary inquiries - have been published:

- [Green Paper on Digital Change and Politics](#) (2015)⁶
- [Green Paper Digital Courage](#) (2016)⁷
- [Green Paper on Digitalisation and Democracy](#) (2017)⁸
- [Green Paper Designing a socially equitable Digital Future](#) (2018)⁹

2018/19: Mandatory course Digital Basic Education

Parliamentary discussions and resolutions or legislative processes clearly show that digitalisation and its consequences no longer are a private matter of individuals, institutions or companies. With the introduction of the mandatory course „[Digital Basic Education](#)“¹⁰ (replacing the above-mentioned concept *digi.comp8*), 14-year-old Austrians – thus, graduates of all New Secondary Schools and all grammar schools – are now expected to have a solid digital education. This development also has an impact on the question to what extent digital competence is now seen „common“ and „taken for granted“ among adults of all ages.

The curriculum for „Digital Basic Education“ managed to successfully link digital and IT competences as well as media competence, socio-political competences affected or addressed by digitisation and, in particular, the communities behind them and their expertise together beneath one umbrella.



The curriculum for Digital Basic Education combines digital and computer literacy with media and socio-political literacy (Source: Praxishandbuch Digitale Grundbildung – courtesy of Haider Lehrmittelverlag OG)¹¹

As part of the mandatory course¹², pupils acquire competences from these areas (two to four hours per week and year over a period of four years):

1. Social aspects of media change and digitalisation
2. Information-, data- and media literacy
3. Operating systems and standard applications
4. Media design
5. Digital communication and social media
6. Safety
7. Technical problem solving
8. Computational thinking

2019: Digital Austria

For more than 20 years, Austria contributes to the growth of digital competences of citizens and the possibilities and demands of digitalisation through a number of indispensable services:

- **help.gv.at** – has been a hub providing information between authorities and citizens about official channels and, if available, the possibilities for their electronic processing since 1997. In March of 2019, the services of help.gv.at have been transferred to the online-platform oesterreich.gv.at.
- **ris.bka.gv.at** - the digital legal information system of the Republic of Austria has been online since 1998; since 1.1.2014, the legally effective announcement of applicable law is published exclusively on this website.
- **finanzonline.bmf.gv.at** - since 2003, the „digital tax authority“ is open twenty-four hours a day, seven days a week and enables, for example, the digital transmission of tax returns and income tax forms.
- **usp.gv.at** - is the central web portal of the Republic of Austria for companies since 2010 and offers, for example, access to e-government applications such as e-founding or e-invoicing.
- **handy-signatur.at** - since 2009 the mobile phone signature has become a legally valid signature and digital ID all in one. This digital signature, for example, enables citizens to register for all services listed above.

The Federal Government declared 2019 as the „Year of Digitalisation“.

In future www.oesterreich.gv.at will be the central online platform enabling citizens to access official channels from anywhere at any time. The umbrella brand “**Digital Austria**” combines all digital services of the Republic.

DigComp 2.2 AT - the Austrian version of the European competence framework

The competence model DigComp 2.2 AT is the Austrian version of the European DigComp 2.1 reference framework and outlines the field of digital competences of citizens in a general and comprehensive way. In comparison to the European Reference Framework in English, the Austrian model was translated into German and was extended - slightly but at some relevant positions. This process is made shown transparent hereafter, as it has significantly influenced the result, namely the DigComp 2.2 AT Competence Framework.

The development process

Frameworks of reference are „artificial“ frameworks of thought that attempt to model complex and evolving realities. They are helpful and necessary in order to gain understanding, orientation, imagination, conceptuality, discourse capability and obtain an overview. They support the assessment and description of personal and sometimes institutional competences and reveal strengths and areas to promote.

However, they are always the result of discourse, consultation and negotiation processes and thus differ significantly from scientific-mathematical theories.



Digital competence in everyday life

In line with the European Commission's tradition of developing both, the eight key competences for lifelong learning and its DigComp Reference Framework, the development of the Austrian DigComp 2.2 AT version also started with a research and consultation process.

Context research and consultation process

The context research and consultation process took place in August, September and October 2018 on behalf of the Federal Ministry for Digital and Economic Affairs. Based on preliminary discussions, structured interviews with experts were conducted across all domains of adult education.

The evaluation was carried out as a qualitative content analysis and led to the following results (summary).

1. The competence framework DigComp 2.1 should be extended by a competence area including basic conceptual knowledge about digitalisation, IT, the Internet etc. as well as the interaction and operation of digital devices.
2. Knowledge of legal regulations („the Internet as a legal area“) needs to be integrated.
3. Critical thinking and the evaluation of information are essential aspects and should be made clear.
4. Independent learning as well as digital learning should have corresponding weight, whereby informal learning in particular is of great importance.
5. The number and definition of competence levels is criticised and should be reconsidered, though the connectivity (cf. EQF/NQF) should be taken into account.

Language-sensitive translation into German - revision and addition of content

In September and October 2018, the complete English DigComp 2.1 reference framework was translated into German and supplemented based on the findings of the consultation process.

The German translation was based on the English original text word by word, as far as possible. Areas where the exact wording would have disturbed the translated meaning of the German text, a better equivalent was sought after. For example:

- The competence „2.3 Engaging in citizenship through digital technologies“ was translated as „2.3 Using digital technologies for social participation“. This change also reflects the relevance of social participation in the Austrian political discourse, as is evident, for example, in the Green Papers of the Federal Council.
- The outdated term „2.5 Netiquette“ was renounced; the competence is now called „2.5. Using appropriate forms of expression“.

In line with the results of the consultation process, additions, streamlining and extensions were carried out. For example:

- The issue of the first access to the field of digital competences was neglected in the European model and therefore, together with its prerequisites integrated into the DigComp 2.2 AT with the serial number 0. In the opinion of the authoring team this step is a significant improvement of the Austrian model compared to the European guideline.
- In particular, it provides a basis for all fundamental aspects of social participation in the field of digital competences. In future, the importance of the competence „0.1 Understanding the concepts of digitalisation“ will presumably turn out to be particularly important. Living in a digitised world means being able to recognise, understand and, if necessary, avoid their (problematic) effects and interrelations.
- The aspects of business transactions (purchase, exchange, auction, app store, etc.) as well as fraud prevention and consumer protection were completely absent and were supplemented by the competences „2.4 Carrying out purchases and sales“ and „4.4 Protecting oneself and others against fraud and consumer rights abuse“.
- Due to the technological progress and concrete practise, the authoring team considered it reasonable to combine the competences „2.2 Sharing through digital technologies“ and „2.4 Carrying out purchases and sales“, which are mentioned separately in DigComp 2.1, as „2.2 Using digital technologies to share data and information and to cooperate“.
- Competence 3.4 in the Austrian version was renamed „Programming and Automating Processes“, which better reflects reality in everyday life for the general population.
- Last but not least, the competence area „5. Problem solving“ is now substantially supplemented as „5. Problem solving and continuing learning“.

No transfer or reformulation of detailed competency characteristics at the individual competency levels was undertaken. In the opinion of the authoring team, the insight value of the English DigComp 2.1 text is hardly worth mentioning here. After completion of the transmission and supplementary work, it appeared reasonable to comply with the overall more far-reaching changes made by introducing a new DigComp version number 2.2 AT.

Understanding DigComp – contents and dimensions of the competence framework

The Digital Competence Framework DigComp 2.2 AT is multidimensional.¹³

1. On the one hand, the competence model divides the field of digital competences into six areas, which are further described in twenty-five individual competences.
2. On the other hand, the model describes the development and characteristics of these competences on eight levels.
3. In fact, the competence framework extends into a third dimension: namely the dimension of difficulty, complexity, scope of skills and knowledge at specific competence levels. However, both the European model and the Austrian version of the competency framework do not make any qualitative assessment of skills and knowledge aspects at the various competency levels. For example by means of further indicators, the model does not make any statements as to whether a person has „very good“, „satisfactory“ or „sufficient“ command of the competence „2.1. Interacting through digital technologies“ at level 3. For the basic understanding and applicability of the competency framework, it is sufficient to be fully aware of this dimension.

The competences of humans in the face of digitalisation, however, cannot be neatly „put into a cube“ in reality. In another model, the field of digital competences may resemble a tree. This version might be straightforward with regards to the tree's trunk (levels 1 to 4), but the tree rapidly grows in all directions and thus, „in the blue“ after level 5.

Dimension competence areas (6) and competences (25)

In the following presentation of the six competence areas and twenty-five competences of the DigComp 2.2 AT competence framework, all adjustments to the European model are made visible in colour.

DigComp 2.1 (2017)	DigComp 2.2 AT (2019)
	0. Foundations and access 0.1 Understanding the concepts of digitalisation 0.2 Handling digital devices 0.3. Using and providing inclusive forms of access to digital content
1. Information and data literacy 1.1 Browsing, searching, filtering data, information and digital content 1.2 Evaluating data, information and digital content 1.3 Managing data, information and digital content	1. Information and data literacy 1.1 Browsing, searching and filtering data, information and digital content 1.2 Critically evaluating and interpreting data, information and digital content 1.3 Managing data, information and digital content
2. Communication and collaboration 2.1 Interacting through digital technologies 2.2 Sharing through digital technologies 2.3 Engaging in citizenship through digital technologies 2.4 Collaborating through digital technologies 2.5 Netiquette 2.6 Managing digital identity	2. Communication and collaboration 2.1 Interacting through digital technologies 2.2 Using digital technologies to share data and information and to cooperate 2.3 Using digital technologies for social participation 2.4 Carrying out purchases and sales 2.5 Using appropriate forms of expression 2.6 Managing digital identity
3. Digital content creation 3.1 Developing digital content 3.2 Integrating and re-elaborating digital content 3.3 Copyright and licences 3.4 Programming	3. Digital content creation 3.1 Developing digital content 3.2 Integrating and re-elaborating digital content 3.3 Copyright and licences 3.4 Programming and automating processes
4. Safety 4.1 Protecting devices 4.2 Protecting personal data and privacy 4.3 Protecting health and well-being 4.4 Protecting the environment	4. Safety 4.1 Protecting devices 4.2 Protecting personal data and privacy 4.3 Protecting health and well-being 4.4 Protecting oneself against fraud and consumer rights abuse 4.5 Protecting the environment
5. Problem solving 5.1 Solving technical problems 5.2 Identifying needs and technological responses 5.3 Creatively using digital technologies 5.4 Identifying digital competence gaps	5. Problem solving and continuing learning 5.1 Solving technical problems 5.2 Identifying needs and technological responses 5.3 Creatively using digital technologies 5.4 Identifying digital competence gaps

For a better understanding of what is meant by the competences, these are briefly described in the following table:

Digital Competences - DigComp 2.2 AT (2019)
0. Foundations and access
0.1 Understanding the concepts of digitalisation - Understanding the technical difference between "analogue" and "digital" and the basic structures, characteristics and notions of the Internet.
0.2 Handling digital devices - Acquiring and using different operating concepts of digital devices.
0.3. Using and providing inclusive forms of access to digital content - Understanding, using or providing technological forms of digital accessibility (e.g. automated translation, voice output option). Awareness of gender, diversity, cultural context, people with special needs such as mental and physical disabilities.
1. Information and data literacy
1.1 Browsing, searching and filtering data, information and digital content – articulate information demand; search, access and navigate data, information and content in digital environments; create and update individual search strategies.
1.2 Critically evaluating and interpreting data, information and digital content – Analysing, comparing and critically evaluating the credibility and reliability of data sources, information and digital content; analysing, interpreting and critically evaluating data, information and digital content.
1.3 Managing data, information and digital content – Organising, storing, and retrieving data, information and content in digital environments; organizing and processing data, information and content in a structured environment.
2. Communication and collaboration
2.1 Interacting through digital technologies – Interacting through a variety of digital technologies and using appropriate digital means of communication for a specific context (including cultural, social, gender and other differences).
2.2 Using digital technologies to share data and information and to cooperate – Sharing data, information and digital content with other people using appropriate digital technologies; acting as an intermediary; being aware of referral and matching practices. Using digital tools and technologies for collaborative processes and the joint creation and development of resources and knowledge.
2.3 Using digital technologies for social participation – Participating in society through the use of public and private digital services; seeking opportunities for self-empowerment and participatory citizenship with appropriate digital technologies.
2.4 Carrying out purchases and sales – Conducting commercial (purchase and sale, auction and bidding) and non-commercial (exchange, gift) transactions of goods and services of all kinds.
2.5 Using appropriate forms of expression – Being aware of behaviour patterns and norms when using digital technologies and interacting in digital environments; adapting communication strategies to stakeholders; be aware of the diversity of cultures and generations in digital environments. Identifying appropriate communication channels, and determining whether formal or informal communication is suitable. Adequate behaviour in online discussions.
2.6 Managing digital identity – Creating and managing one or more digital identities; maintaining one's reputation; taking care of the data generated by different digital tools, environments and services.
3. Digital content creation
3.1 Developing digital content – Creating, editing and applying digital content in a variety of formats; expressing oneself digitally.

Digital Competences - DigComp 2.2 AT (2019)
3.2 Integrating and re-elaborating digital content – Integrating, modifying, refining and improving information and content into an existing knowledge base; creating new, inventive and relevant content and knowledge.
3.3 Copyright and licences – Understanding how copyright and licenses for data, information and digital content are applied.
3.4 Programming and automating processes – Planning and developing a sequence of understandable instructions for a computer system to solve a specific problem or perform a specific task.
4. Safety
4.1 Protecting devices – Protecting devices and digital content and understanding risks and threats in digital environments; being aware of security and safety measures and paying attention to reliability and privacy.
4.2 Protecting personal data and privacy – Protecting personal information and privacy in digital environments; understanding how to use and share personally identifiable information while protecting yourself and others from harm; understanding that digital services use a "privacy policy" to inform about the use of personal information.
4.3 Protecting health and well-being – Avoiding health risks and threats to one's physical and mental well-being when using digital technologies; protecting oneself and others from potential threats in digital environments (e.g. Cybermobbing); being aware of digital technologies for social well-being and inclusion.
4.4 Protecting oneself against fraud and consumer rights abuse – Identifying dubious online shops; knowing the most important legal provisions; applying buyer protection measures and being able to compare prices.
4.5 Protecting the environment – Being aware of the environmental impacts of digital technologies and their use.
5. Problem solving and continuing learning
5.1 Solving technical problems – Identifying and solving technical problems related to the operation of devices and the use of digital environments (from troubleshooting to solving complex problems).
5.2 Identifying needs and technological responses – Recognizing and identifying needs as well as evaluating, selecting and using digital tools and possible technological responses; adapting digital environments to personal needs (e.g. accessibility).
5.3 Using digital technologies creatively – Using digital tools and technologies to create knowledge and innovate processes and products; individually as well as collectively engaging with others in thought processes to understand and solve conceptual problems and problem situations in digital environments.
5.4 Identifying digital competence gaps – identifying one's areas of improvement; supporting others in their digital literacy development; seeking opportunities for self-development and keeping pace with digital evolution.

Dimension proficiency levels (8)

The framework describes the development and expression of these competences on eight levels. This level structure allows the DigComp competence framework to correlate with the European Qualification Framework EQF, also consisting of eight levels, or the National Qualification Framework NQF¹⁴, which derives from it and comprises eight levels as well.

Competence	Level
Foundation	Level 1
	Level 2
Intermediate	Level 3
	Level 4
Advanced	Level 5
	Level 6
Highly specialised	Level 7
	Level 8

The European DigComp reference framework defines the individual steps as follows:

DigComp-Reference Framework	Levels	Complexity of tasks	Autonomy	Cognitive domain ¹⁵
Foundation	Level 1	Simple tasks	With guidance	Remembering
	Level 2	Simple tasks	Autonomy and with guidance where needed	Remembering
Intermediate	Level 3	Well-defined and routine tasks, and straightforward problems	On my own	Understanding
	Level 4	Tasks, and well-defined and non-routine problems	Independent and according to my needs	Understanding
Advanced	Level 5	Different tasks and problems	Guiding others	Applying
	Level 6	Most appropriate tasks	Able to adapt to others in a complex content	Evaluating
Highly specialised	Level 7	Resolve complex problems with limited solutions	Integrate to contribute to the professional practice and to guide others	Creating
	Level 8	Resolve complex problems with many interacting factors	Propose new ideas and processes to the field	Creating
Explanation: Cognitive process dimension - The „cognitive domain“ is oriented on <u>Revised Bloom's Taxonomy</u> .				

Three examples of different competence levels help illustrate what has been outlined more concretely:

- **Level 1 – Task: Learning how to use a smartphone:** In order to be able to acquire digital skills in the first place, an initial introduction is necessary. A simple task (switching on the mobile phone or using an app) is presented and should then be imitated by the learner. During the learning process, several revisions help to remember the way of working. Quick learners might be able to need support only on occasion (level 2) or to complete a task on their own (level 3).
- **Level 5 – Task: Teaching how to use software:** In order for someone to learn something, content needs to be taught and communicated. Switching mobile phones on and off. Calling up and using an app. Competently using office-, image- or stock management systems. These tasks may vary greatly in terms of demands and the depth of knowledge and skills that are required. These tasks share the requirement of being able to deal with tasks and problems of all kinds (particularly in the field of the respective competence or expertise), guiding others and being able to apply knowledge, skills and experience.
- **Level 8 – Task: Develop the DigComp 2.2 AT Competence Framework:**
A complex task with many influencing and interacting factors. Within the process, something new can be proposed and created.

Dimension difficulty and complexity of tasks

As already mentioned, the development and handling of competence frameworks is not a precise mathematical science, but a discursive negotiation and decision-making process. It should be borne in mind that tasks at a single competence level (e.g. the confident operation of a software – level 4 – or the decision-making competence for the purchase of a certain software and the assessment required for this – level 6) may vary in complexity, length and difficulty. However, this does not affect the competence levels in which they are classified. To give an example: it does not matter whether one's A-levels were just completed with excellent success or not as the education level is the same.

Furthermore, everyday life is determined by complex, thus interrelated and interdisciplinary demands and tasks. Even a simple search engine query affects several digital competencies. This includes basic knowledge of the algorithms used to display specific search results (and advertisements) only to me - but not to other people.

Digital everyday competence

A concrete application example of the DigComp 2.2 AT competence framework are the digital everyday competences of adults. Adults should be able to locate their digital competences at least at competence levels 3 to 4. Thereby it is less important whether

one or other competences are at level 3, level 4 or perhaps even level 5. (After all, parents should be able to teach their children digital competence – a task at competence level 5.)

For digital everyday competence, it is important to move consistently within a „competence range“ on levels 3 and 4 in all six competence areas as well as all twenty-five competences. After all, the most elaborate knowledge in film editing, i.e. in competence area 3 „Creation of digital content“, does not excuse the responsibility or necessity of understanding competences in competence area 4 „Safety“ to a certain extent and to behave accordingly.

Digital Competence - Future Developments

The aspect of digital everyday skills addresses the issue of future developments:

- Although **digital skills in everyday life** are self-evident for millions of Austrians, they are still far from being a matter of routine for everyone. Moreover, this dynamic development means that we have to continue learning on an ongoing basis.
- In addition, digital competence in everyday life is the basis for – in some cases highly specialised – **digital competences in the workplace**. Many companies, therefore, strive to secure their employees' basic skills and to develop them further.
- **Innovation** is one of the biggest aspects of digitalisation - the next surprise is coming soon. Therefore, digitalisation, its possibilities and the associated competences need to be thought of and applied „out-of-the-box“.
- In addition to the emphasis on the effects of digitalisation, attention must also be focused on the **undesirable side effects**. Digitisation as well as digitalisation is not an end in itself, but must serve society and the individual, particularly in terms of European values and human rights.

None of this can happen by chance as, it has to be introduced systematically, goal-oriented and sustainable. It also requires a wide range of measures as well as the establishment of appropriate institutions in order to meet the complex challenges.

Further development of the competence model – the DigComp Taskforce

With an interdisciplinary Austrian DigComp Taskforce, the Federal Ministry for Digital and Economic Affairs is establishing an advisory board for digital competences, whose recommendations are publicly available to all stakeholders in politics, business, and science.

The association fit4internet is entrusted with the establishment and the chairmanship. The permanent members from fields of adult education, science and research as well as economy are invited by the Federal Ministry for Digital and Economic Affairs on proposal of the General Secretariat of fit4internet and work free of charge. The overall leading criteria for the appointment of the task force are professional expertise, interdisciplinary, independency and non-partisanship.

In all current activities and projects, the task force seeks to cooperate with other relevant national and international bodies and institutions such as the Digitalisation Agency or the Joint Research Centre of the European Commission.

Based on the DigComp Framework (The Digital Competence Framework for Citizens) of the European Commission and oriented towards social, economic, and technical developments, the interdisciplinary Austrian DigComp Taskforce curates the Austrian version of this framework for digital competences, DigComp 2.2 AT, and initiates and implements projects.

Objectives of the current work, activities and projects of the task force are the following:

- **Acceptance:** The Austrian DigComp competence framework should become and remain a work base for the development and improvement of the digital competences of all citizens in Austria which is widely accepted, as broadly understood and as coherently interpreted as possible.
- **Update:** The Austrian DigComp competence framework and the application scenarios derived from it are updated continuously and, if necessary, expanded by the task force in order to keep pace with the dynamics of digitalisation and its opportunities and challenges.
- **Networking:** Initiatives, measures, best practices and new ideas should be exchanged and connected as broadly and intensively as possible through the task force and its members.
- **Quality Management:** The members of the Task Force ensure the quality and coherence of all measures with their participation in specific DigComp implementation and accompanying projects (funding programmes, research projects, working groups, referencing-, evaluation- and certification measures etc.).

The DigComp Taskforce is available to the public jointly or in person of its individual members as a discussion and information partner (panel discussions, press conferences, jury activities, etc.) and thus actively ensures an in-depth understanding of the opportunities and challenges of digitalisation.

Selected literature

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References

- 1 In simplified terms, one could compare level 1 of the Austrian NQF in the area of formal educational qualifications, for example, with the primary school level and level 8 with a university lectureship
- 2 <https://eur-lex.europa.eu/legal-content/DE/TXT/HTML/?uri=CELEX:32006H0962&from=DE>
(Access: 11.1.2019)
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- 11 <https://www.haider-lmv.at/Digitale-Grundbildung-Arbeitsmappe-nur-als-CD-erhaeltlich/HL10012>
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- 12 Details on content and implementation of the curriculum: <https://www.virtuelle-ph.at/digigrubi/>
(Accessed: 11.1.2019)
- 13 The publication on the DigComp 2.1 reference frame speaks of a total of five dimensions, here always associated with the German terminology chosen in this publication: (1) Competence area - competence area (2) Competence descriptors and titles - competence (3) Proficiency level - competence level (4) Knowledge, skills and attitudes - / (5) Examples of use - /. The DigComp 2.2.AT is satisfied with the analogy of three dimensions and refrains from including individual competences and their expression at certain competence levels in the narrower model. One of the main reasons has been that digital competence appear in everyday life in more or less complex application scenarios that always affect several competences simultaneously.
- 14 In simplified terms, one could compare level 1 of the Austrian NQF in the area of formal educational qualifications, for example, with the primary school level and level 8 with a university lectureship.
- 15 The „cognitive domain“ is based on the „Revised Bloom's Taxonomy“, as e.g. explained here: <http://www.celt.iastate.edu/teaching/effective-teaching-practices/revised-blooms-taxonomy>
(Accessed: 21.9.2018)

