

DigiSET – The Academy of Digitally Sustainable European Teacher

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Teachers' Competences for Digital Sustainability in Austria

A survey amongst (future) teachers

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Disclaimer on Methodology and Authorship

The development of the survey instrument was a collaborative effort involving the entire consortium. However, the selection of scales and the final composition of the questionnaire were done by Dila Oral, Sezin Esfer and Sabiha Dulay (both BAU), Filiz Keser Aschenberger (UWK), Erina Guraziu (OpenCom), and Sandra Schön (TU Graz). The analysis template as well as the data analysis process — including data cleaning, selection, and the creation of all charts and diagrams — were carried out by Bettina Mair and Sandra Schön (both TU Graz). The textual descriptions, interpretations, and conclusions presented in this report reflect the views of the respective authors listed herein and are their sole responsibility. In addition, please note that certain descriptive and introductory sections of this report are based on consortium-wide templates applied uniformly across all country reports to ensure comparability. The specific analyses, interpretations, and country-specific findings remain the responsibility of the respective national teams.

Disclaimer on AI usage

Based on Academic Integrity and Transparency in AI-assisted Research and Specification Framework (Bozkurt, 2024, DOI: 10.55982/openpraxis.16.1.654), the authors of this report acknowledge that it was drafted with the assistance of Lumo (Versions as of July 2026), complementing the human editorial process. The human authors critically assessed and validated the content to maintain academic rigor. The authors also assessed and addressed potential biases inherent in the AI-generated content. The final version of the paper is the sole responsibility of the human authors.

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Abstract

This report presents the results of the DigiSET teacher survey conducted in Austria, as part of the Erasmus+ project “DigiSET – The Academy of Digitally Sustainable European Teacher” (101249272). The survey aimed to assess (future) teachers' self-perceived competences in digital teaching, artificial intelligence (AI), education for sustainable development (ESD), and open educational resources (OER), as well as their perceptions on four DigiSET-specific topics: adaptive AI use, gender bias in AI, inclusive practices for students with learning difficulties, and systems thinking for sustainability. Data were collected between May 2026 and June 2026 using an online questionnaire based on existing scales (DigCompEdu Check-In, TALCS, ATOER) and project-specific items. A total of 152 total responses were received, of which 106 were included in the analysis following data cleaning procedures. Respondents were primarily a digitally engaged group comprising 54% practising teachers (mostly at public secondary schools) and 29% students, with a strong overrepresentation of subjects like Mathematics (46%) and Computer Science/Digital Literacy (45%).

Key findings indicate that participants reported highest confidence in professional engagement and digital resources (e.g., 80% regularly find/select resources), but showed significant weaknesses in assessment (37% rarely use digital assessment tools) and AI-based grading (44% lack confidence). Regarding AI competence, while 80–81% feel confident explaining AI or creating content, confidence drops sharply in pedagogical application and assessment design. For ESD, respondents strongly endorse values (92% agreement) but struggle with practical implementation, particularly using digital technologies for sustainability challenges (only 48% agree). In terms of OER, half of the respondents have experience, yet 20–36% disagree with their competence to adopt OER, indicating a gap between awareness and practice. Among the four DigiSET-specific topics, respondents showed the highest confidence in systems thinking for sustainability (87% encourage critical reflection) and the lowest in adaptive AI use (33% lack confidence) and inclusive digital practices (43% rarely adapt materials). The most pressing professional development needs identified were inclusive digital teaching (48%), using adaptive learning tools (39%), and using AI in teaching (38%), while the most frequently reported barriers were lack of time (73%) and lack of available training or suitable resources (40% and 38%).

The findings should be interpreted considering the non-representative, self-selected sample which overrepresents computer science teachers and students, leading to likely inflated competence estimates compared to the national average, as well as the self-reported nature of the data. Despite these limitations, the results provide valuable evidence for the design of the DigiSET Teacher Academy and the development of targeted training modules tailored to the national context of Austria.

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1. Introduction

1.1 Background and aim of the DigiSET survey

The DigiSET project (The Academy of Digitally Sustainable European Teacher) represents a transformative initiative addressing the urgent need for digital upskilling among European educators within a cross-border framework. The primary objective of DigiSET is to develop and implement a European Academy for teachers, equipping them with the competences to create, use, and adapt Open Educational Resources (OERs), digital technologies, and AI algorithms. DigiSET aims to enhance the digital skills of European educators, aligning with the DigCompEdu, LifeComp, and GreenComp frameworks. It addresses the specific need for teacher upskilling in digital technologies through comprehensive training and a supportive community of practice, fostering a sustainable education system across Europe.

To ensure that the training program effectively meets the needs of educators across diverse national contexts, needs analysis were conducted via a comprehensive teacher survey in all DigiSET countries. So, the presented survey in Austria serves as the empirical foundation for understanding the status of digital and sustainability teaching competences, identifying specific barriers to integration, and validating the requirements for the targeted training modules.

1.2 Austria's national strategies concerning teachers' competences for digital sustainability and current developments

We have already conducted a desktop analysis of the situation in Austria (Schön et al., 2026), and this survey represents a second step in our comprehensive research approach. Austria demonstrates a forward-looking approach to integrating DigiSET themes within its national education strategies, particularly through the early development and continuous refinement of teacher competence frameworks. The cornerstone of this effort is the *digi.kompP* framework, which was initially developed in 2016 to address specific needs of Austrian teacher education, predating several European competence frameworks (Brandhofer & Miglbauer, 2020, p. 10). This proactive positioning has enabled Austria to establish a robust foundation for digital and sustainable teaching competences well ahead of broader European developments.

The most recent update to the digital teaching competences for teachers framework by Brandhofer et al. (2026), published in April 2026, marks a significant evolution in addressing emerging educational priorities (Schön et al., 2026 p. 10ff): This revision explicitly integrates artificial intelligence as a core competence area for educators, defining four progressive competency levels: identifying the potential of AI in subject teaching, utilizing AI potentials, reflecting on AI applications, and harnessing AI within co-creative learning spaces and processes (criterion E.8.1-E.8.4). Simultaneously, Education for Sustainable Development (ESD) is firmly embedded within Category B ("Digital Living"), requiring teachers to describe interactions between technology and society, utilize opportunities for sustainable education, evaluate these opportunities for their teaching practice, and actively shape future sustainable education prospects (criterion B.2.1-B.2.4). Beyond AI and sustainability, the updated framework addresses ethical challenges comprehensively (criterion

B.11, p. 12). Additionally, accessibility and inclusion are systematically integrated across multiple criteria (B.12, C.7). Open Educational Resources (OER) have been explicitly referenced since 2021 in Category C (Criterion C.9.1-C.9.4), with specific criteria enabling teachers to find, use legally, verify license conditions, and publish materials under open licenses.

Prominent initiatives support these framework developments. One example is prompting.school (TU Graz) which is an OER initiative for developing AI competences in education through structured, practical learning opportunities (Brünner et al., n.d.). Further CPD offerings include specialized master's programs on “Artificial Intelligence and School Education” at PH Niederösterreich and “Generative Artificial Intelligence in Schools and Teaching” at KPH Wien/Niederösterreich (Schön et al., 2026, p. 17f).

The national strategy connects these developments to implementation structures. The eEducation Austria portal coordinates initiatives across all Austrian school levels while the mandatory school subject “Digitale Grundbildung” was fully integrated into timetables from 2022/2023 (Schön et al., 2026 p. 5f). The Quality Assurance Council (QSR) requires all new teacher education curricula to integrate AI, Media Literacy, and Digitalization & Globalization since 2024 (Schön et al., 2026, p. 7). These curricular requirements will take effect with the start of the 2026/27 academic semester.

Despite these strengths, gaps remain in practical implementation. While foundational digital skills receive robust support, training at the intersection of digital and sustainability competences appears fragmented (p. 19). Education for Sustainable Development is formally required in curriculum revisions, yet actual training opportunities seem unevenly distributed. OER creation lacks systematic hands-on training pathways for schoolteachers, and advanced AI ethics training is currently offered through supplementary seminars rather than as guaranteed components of Initial Teacher Education or mandatory CPD (Schön et al., 2026, p. 19).

As summarized in the Key Findings Section (Schön et al., 2026, 6.4, p. 28), Austria possesses strong foundational frameworks for digital education (digi.kompP) and sustainability (ÖKOLOG), yet these domains operate largely in parallel. The primary gap is not a lack of individual competences but the absence of an integrated approach that positions digital transformation as a lever for sustainability. Future efforts should bridge existing silos by articulating explicit intersections between digital and sustainability competences, with emphasis on practical application and ethical reflection.

Since the publication of this desk research overview at the end of April 2026, Austria has taken another significant step: In June 2026, the National Council passed a major curriculum reform for the AHS upper secondary level (Sekundarstufe II), introducing two new compulsory subjects starting from the school year 2027/28 (Parlament Österreich, 2026a). Education Minister Christoph Wiederkehr announced the introduction of “Informatik und Künstliche Intelligenz” (Computer Science and Artificial Intelligence), which expands the previous informatics instruction to three weekly hours and integrates AI topics such as machine learning, ethical questions, and applications in economy and society. Simultaneously, “Medien und Demokratie”

(Media and Democracy) will be introduced as a new compulsory subject with two weekly hours, aimed at strengthening democratic values, media-critical competences, and the handling of digital media (Bundeskanzleramt, 2026). Both subjects will be implemented without increasing the total number of lessons; the required time is created primarily through reductions in Latin and other elective subjects. Schools will have autonomy in implementation, allowing them to teach the new subjects independently or combine them with related subjects (Der Standard, 2026). This reform is part of the broader initiative "*Plan Zukunft*" led by Minister Wiederkehr, which seeks to modernise curricula for the 21st century (Parlament Österreich, 2026b). The decision sparked controversy in parliament, particularly regarding the reduction of Latin hours, with opponents arguing that Latin constitutes part of general education, while proponents emphasised the necessity of equipping students with AI literacy and democratic competences (Parlament Österreich, 2026a). Notably, this development reinforces the direction already indicated in the DigiSET desk research report, which documented the ongoing policy debate about introducing computer science as a mandatory subject at the upper secondary level and a newly established curriculum team working on a revised combined "Media and Informatics" curriculum since mid-2025 (p. 6). The now-formalised introduction of dedicated compulsory subjects for AI and democracy education represents a concrete implementation of this policy trajectory and further strengthens Austria's positioning at the intersection of digital and civic education — potentially relevant to the DigiSET thematic areas of gender-unbiased AI, systems thinking, and inclusive teaching practices.

1.3 Structure

Following this introduction, Section 2 outlines the research methodology, detailing the sampling strategy, and data collection processes specific to the national context. Section 3 provides a comprehensive demographic profile of the respondents, offering essential context regarding their professional status, teaching experience, and subject specializations. The core empirical findings are presented in Section 4. This section systematically analyses teacher competences across four primary domains: Digital Teaching Competence, AI Competence, Education for Sustainable Development (ESD), and Open Educational Resources (OER). Furthermore, it examines specific competence requirements regarding adaptive AI use, gender bias, inclusive practices, and systems thinking, alongside an analysis of faced challenges and professional development needs. Section 5 synthesizes these results through a critical discussion, contextualizing the findings within the national framework and current state of research while addressing the generalizability and limitations of the study. Finally, Section 6 delineates the implications derived from the data, offering evidence-based recommendations for the development of the DigiSET Framework of Learning Outcomes and proposing strategies for the integration of these outcomes into national teacher training provisions.

2. Methodology

This section describes the methodological approach underlying the DigiSET teacher survey in Austria, including the survey development, sampling strategy, data collection procedures, and analytical methods employed.

2.1. Survey development, ethics and analysis

A detailed description of the questionnaire design and the analysis is given in a report by DigiSET (Keser Aschenberger et al., 2026).

In addition to the centrally coordinated analysis, for the Austrian country report we conducted an initial qualitative screening of open-ended responses (Q1–Q3) using AI support to identify recurrent themes and extract illustrative quotes. We employed Lumo (version available July 2026), providing instructions consistent with those given to report co-authors. For Question 1, we supplied the following contextual rationale: 'This open-ended question captures qualitative data on barriers and contextual factors that cannot be assessed through closed items. Responses will inform the situational analysis in WP2 and the design of context-sensitive training interventions.' Analysis covered 47 responses from Austrian participants. Output was iteratively refined—including translation into English—and subsequently cross-referenced with original responses by human researchers to validate thematic categorizations. While not a formal qualitative coding procedure, this approach served to efficiently surface dominant patterns prior to deeper manual analysis.

2.2. Sampling strategy and data collection

2.2.1. Target population and recruitment process

The target population of the Austrian DigiSET survey comprised primarily practising teachers and other education professionals across all school levels, broadly corresponding to EQF levels 1 to 5. The recruitment strategy aimed to reach both active teachers and individuals with a general interest in digitally sustainable education, leveraging existing professional networks and personal contacts within the DigiSET context. While the focus was clearly on active, in-service teachers, some dissemination pathways also reached pre-service teachers and students enrolled in teacher education programmes — for example, through university lectures and institutional mailing lists that include student subscribers.

Recruitment was primarily driven through channels connected to the digital education community. While this meant that the connecting theme for most dissemination pathways was digital education, the team also succeeded in involving independent stakeholders beyond the immediate project network. Most notably, the Bildungsdirektion Steiermark (Regional Education Directorate of Styria) was engaged as an institutional multiplier and forwarded the survey invitation through its internal communication channels, thereby reaching practising teachers outside established digital education circles.

First, the Austrian survey announcement was published across several institutional and personal weblogs and social media channels. Sandra Schön's personal and the

E-Learning weblog of Martin Ebner featured an entry promoting the survey (Schön, 2026, April 22; Ebner, 2026, April 27). On social media, the Educational Technology group at TU Graz (LLT TU Graz) posted and reposted survey invitations across Instagram, Facebook, and LinkedIn on multiple occasions between April 20 and April 29, 2026 (e.g. LLT TU Graz, 2026).

At UWK, the survey was disseminated through both external and internal channels. Externally, the invitation was shared through the university's official LinkedIn and Instagram accounts. UWK team members Filiz Keser Aschenberger and Jasmina Dzanic also promoted the survey through their personal LinkedIn accounts and Instagram stories. In addition, the invitation was distributed to teacher education institutions, including the University of Vienna and KPH, and several primary and lower secondary schools in Vienna and Lower Austria were contacted directly and invited to participate. Internally, the survey was circulated among students and alumni of the eEducation and Educational Leadership study programmes between 20 and 30 April 2026. It was subsequently included in the UWK Marketing and Communications newsletter, scheduled for publication at the end of May 2026. To further extend its reach among education practitioners, the survey was also shared with selected stakeholders in local education administration and schools.

Then, a targeted search was conducted for newsletters with a thematic focus on digital teaching and educational technology, followed by direct contact with the respective editors. The OeAD (Austrian Agency for International Cooperation in Education and Research) school newsletter included a survey invitation on May 7, 2026 (OeAD, 2026, May 7). The eEducation Austria newsletter, which exclusively targets digital teaching practitioners, also featured the survey invitation in its 42nd edition around May 8, 2026 (eEducation Austria, 2026). Additionally, the Virtuelle PH included the survey in its "Lernideen" newsletter in July 2026 (Virtuelle PH, 2026, July) and published a news article introducing the DigiSET project and inviting teachers to participate (Schön, April 28, 2026).

Beyond newsletters, direct contact was established with the Bildungsdirektion Steiermark (Regional Education Directorate of Styria), which forwarded the survey invitation through its internal channels. The Kirchliche Pädagogische Hochschule (KPH) Wien also forwarded the invitation to its students (April 23, 2026).

A particularly effective dissemination pathway was the forwarding of the survey invitation by the Pädagogische Hochschule Steiermark, which directly emailed 226 graduates of its "Digitale Grundbildung" (DGB) teacher education programme, inviting them to participate in the DigiSET survey (May 7, 2026) and asking own students at TU Graz (Benedikt Brünner, lecture for computer science teachers, April 2026). The Bildungsdirektion Steiermark additionally redistributed the invitation through its institutional communication channels. These instances illustrate how partner institutions acted as multipliers, extending the reach of the survey beyond the project team's own networks.

In addition to the digital teaching community, we as well reached out Austrian ESD stakeholder, but however, none of the contacted ESD networks shared the survey announcement through their channels to our knowledge.

This observation aligns with a finding noted in the DigiSET desk research report, which identified that digital education and ESD represent largely distinct communities in Austria, with limited reciprocal engagement despite some observable openness between the two domains (Schön et al., 2026, p. 9–10).

2.2.2. Responses and data collection period

Table 1 details the responses of the teacher survey: 152 responded to the survey, but only 106 answered at least two questions. The data collection period was from April 22, 2026 to July 18, 2026.

Table 1: Responses and used entries of the teacher survey in Austria

Responses and used data	
Total	152
No questions answered	45
Only one or two questions	1
Included in the analysis (n)	106

3. Demographic profile of respondents

This section presents the demographic characteristics of the survey participants in Austria, including gender, age, professional status, school levels, subjects taught, and teaching experience, thereby providing the context for interpreting the subsequent findings.

3.1. Gender and age (B6, B7)

Table 2 shows gender of participants: About two-third of the respondents are female, about 28% male, 1% non-binary, 4% preferred not to say.

Table 2: Gender of participants in the teacher survey in Austria

	How do you identify your gender?	
	Frequency	Percent
Woman	57	67,1
Man	24	28,2
Non-binary / Another gender identiy	1	1,2
Prefer not to say	3	3,5
Total	85	100,0

Figure 1 gives insights into the age of the participants. The age distribution is relatively even. The largest proportion (17%) falls within the 21–25 age group. Among older respondents, each five-year age band up to age 60 accounts for between 3% and 11%. Only 2% are younger than 21, and 1% are aged 65 or older.

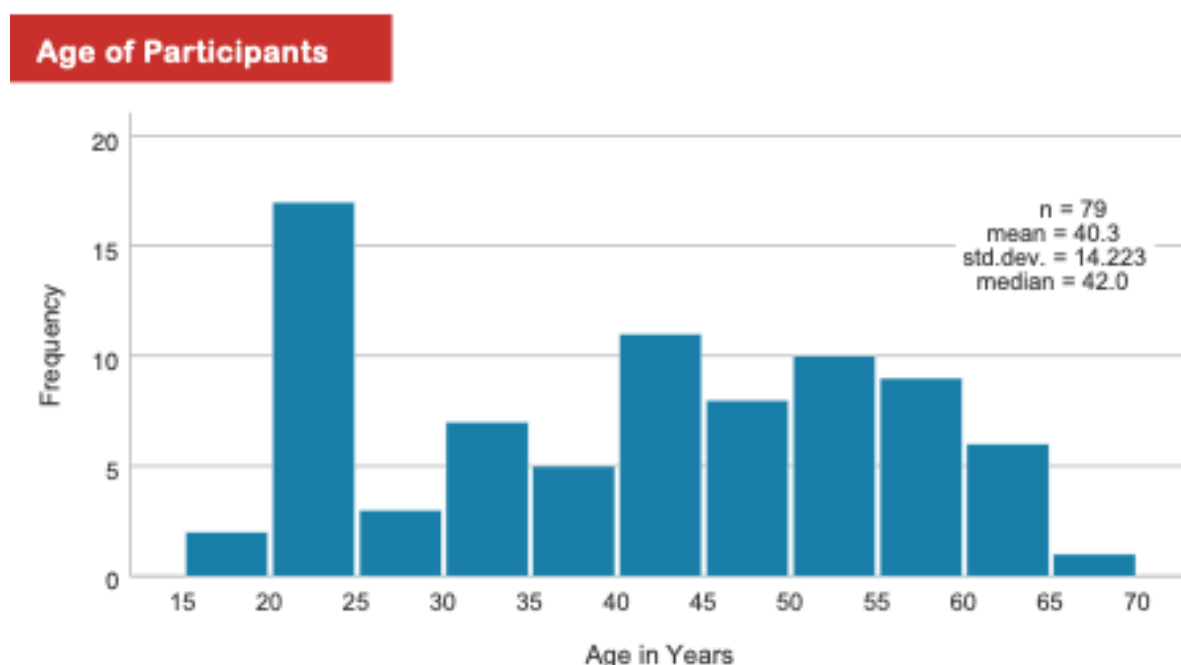


Figure 1: Age of participants in the DigiSET teacher survey in Austria.

3.2. Status of respondents (B1)

Figure 2 shows that a majority of 54% of respondents work at public or state-funded schools, while nearly one-third (29%) are still students. A further 5% are currently seeking employment. The remaining 9% selected "other" and explained that they are, for example, working in teacher training or research, or had previously worked as teachers but have since moved to the private sector.

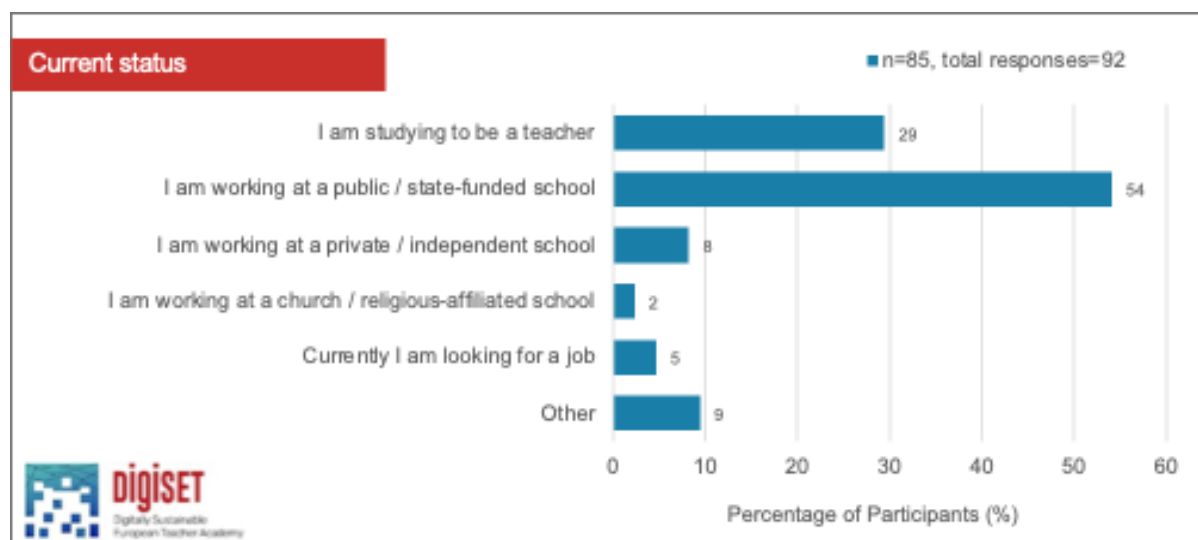


Figure 2: Current status of participants in the DigiSET teacher survey in Austria.

Note: Multiple responses were allowed; therefore, totals exceed 100%.

3.3. School levels taught or expected to teach (B2)

Figure 3 shows that a most respondents (will) teach lower secondary (71%) or upper secondary school levels (52%). Only 8% (will) working with pupils from 6-11 (primary level), 25% (will) work within vocational training. It is to be noted, that multiple responses were allowed.

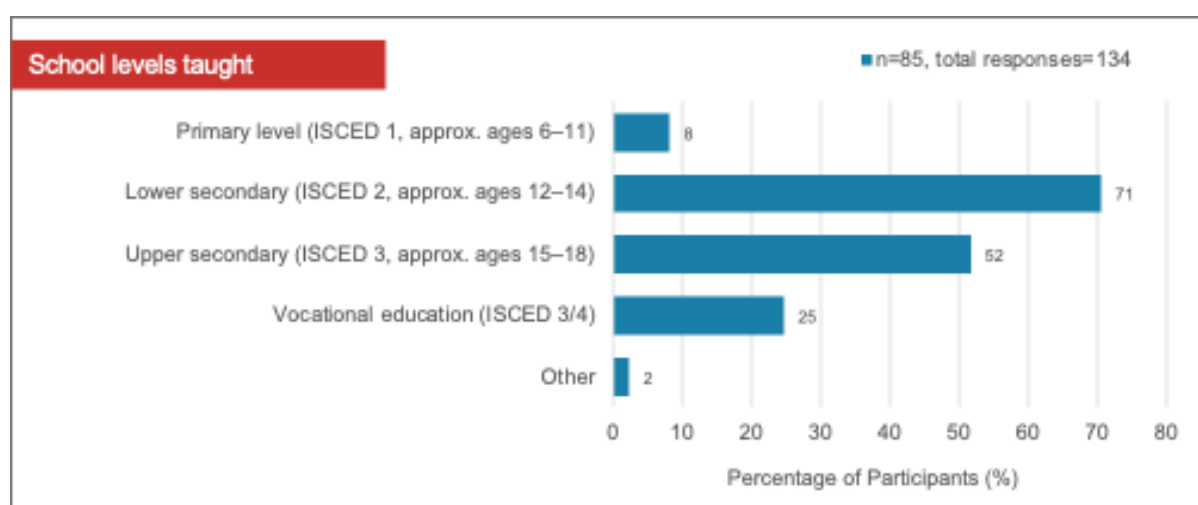


Figure 3: School levels taught or expected to be taught by participants in the DigiSET teacher survey in Austria.

Note: Multiple responses were allowed; therefore, totals exceed 100%.

3.4. Subjects currently taught or expected to be taught (B3)

Figure 4 shows that Mathematics (46%) and Computer Science / Digital Literacy (45%) are the most common school subjects taught or to be taught by the participants. 20% of the respondents teach foreign languages, and only 13% teach German, the native language in Austria. Subjects listed under "other" include, for example, Geography (mentioned four times), as well as topics such as nutrition, social learning, and European education.

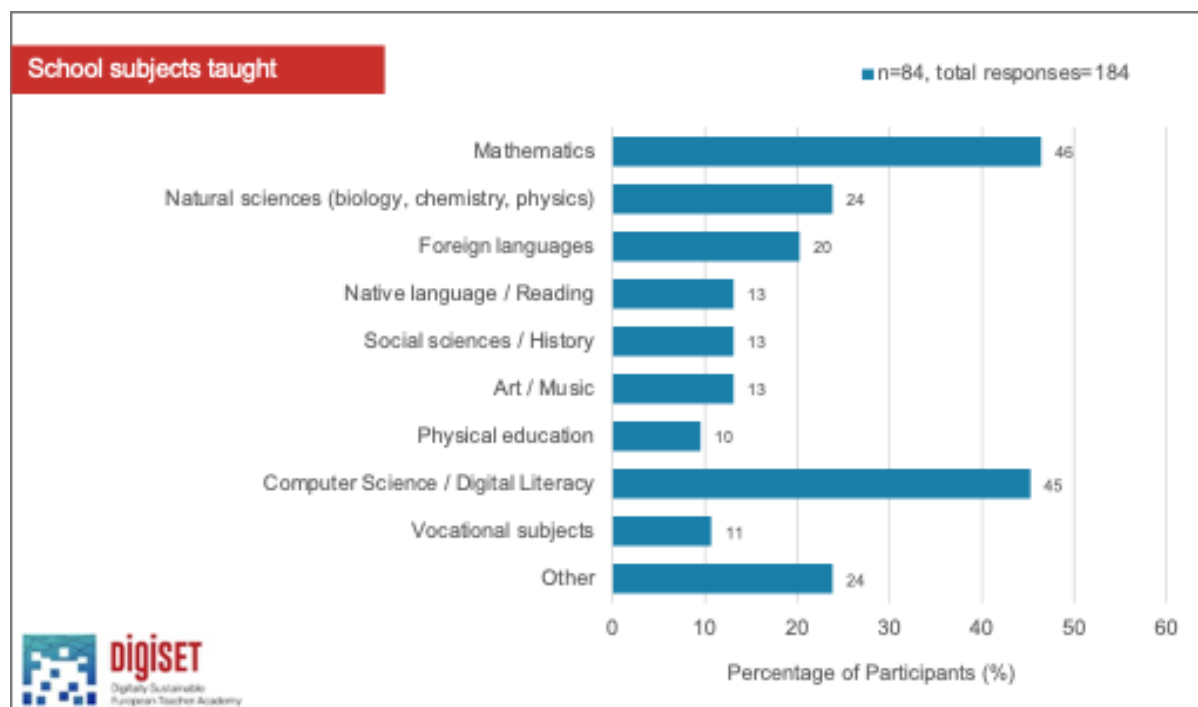


Figure 4: Subjects currently taught or expected to be taught by participants in the DigiSET teacher survey in Austria.

Note: Multiple responses were allowed; therefore, totals exceed 100%.

3.5. Teaching Experiences (B4)

Figure 5 shows that 39% of the participants are experienced teachers with more than 20 years of teaching experience. 18% have no experience at all, and 13% only less than one year. The proportions in the groups with 1–5 years, 6–10 years, 11–16 years and 16–20 years of teaching experience are relatively similar, at around 5%–11%.

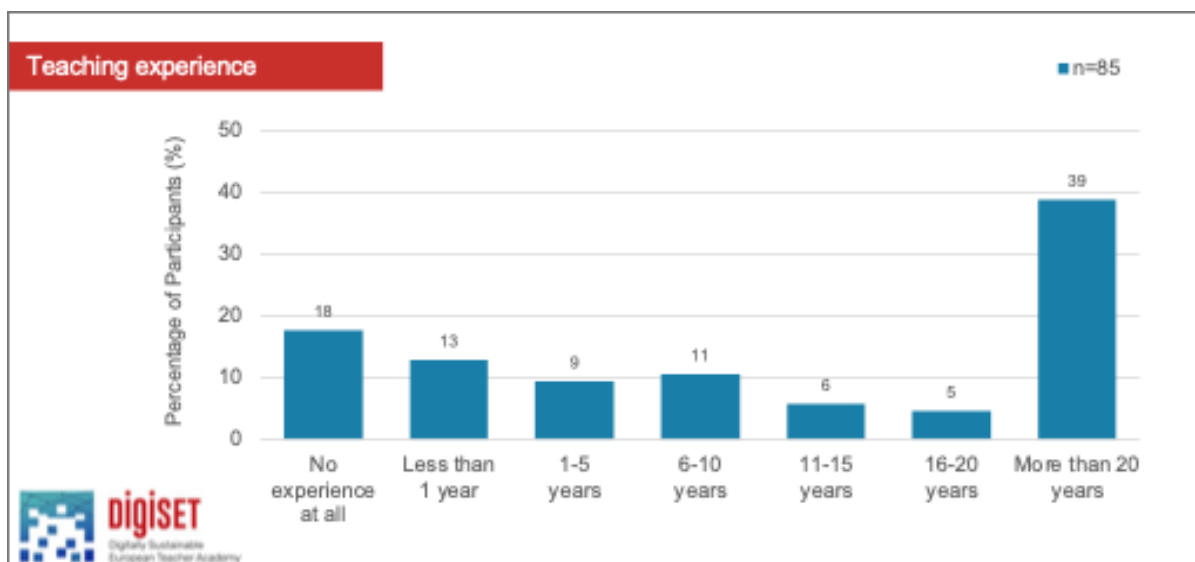


Figure 5: Teaching experiences of participants in the DigiSET teacher survey in Austria.

3.6 Comparison with existing teachers' statistics

To assess the representativeness of our sample, we compared key demographic variables with available national data, namely Statistik Austria and the Austrian Teaching and Learning International Survey (TALIS) report provide data (Koschmieder & Unterköfler-Klatzer, 2025).

Table 3 shows the gender distribution across school types in Austria. When considering only compulsory general education schools, upper secondary general education schools, and other general education (statutory) schools, national data indicates 23% male and 77% female teachers. This ratio remains essentially the same when restricting the calculation to compulsory and secondary general education schools only.

In contrast, the Austrian DigiSET survey reached a relatively higher proportion of male respondents (28%), compared to the national average of 23% (see Table 2, p. 12).

Table 3: Teaching Staff Statistics according to Type of Schools 2025.

Type of school	Total number of teachers	Male teachers	Female teachers
Compulsory general education schools	75 955	14 133	61 822
Upper secondary general education schools	22 273	8 058	14 214
Other general education (statutory) schools	2 002	563	1 439
Vocational schools	4 810	3 113	1 697
Lower and upper secondary vocational schools	22 322	10 437	11 885
Other vocational (statutory) schools	1 023	272	751
Total	128 385	36 576	91 809

Source: STATISTIK AUSTRIA, Teaching Staff Statistics. Compiled on 18 December 2025, <https://www.statistik.at/statistiken/bevoelkerung-und-soziales/bildung/lehrpersonen> (2026-07-22)

Figure 6 shows the age distribution of current teachers in Austria. A comparison with the reached teachers in our survey (see Figure 6, p. 17) reveals that the Austrian DigiSET survey reached – as anticipated – a higher proportion of students and younger teachers compared to typical teacher populations. Similarly, the Austrian TALIS study reports a mean teacher age approximately two years older than our survey sample (Koschmieder & Unterköfler-Klatzer, 2025, p. 37). This difference aligns with our recruitment strategy, which also reached numerous students without any teaching experience.

Our Austrian DigiSET survey sample shows a particularly high proportion of teachers in Mathematics (46%) and Computer Science / Digital Literacy (45%; multiple responses possible). This overrepresentation is consistent with our recruitment strategy, which targeted digital education communities and leveraged contacts within digital teaching networks.

Consequently, competence levels reported in our survey may be higher than the national average for all Austrian teachers, particularly in AI and digital pedagogy domains. These deviations should be considered when interpreting the following competence results.

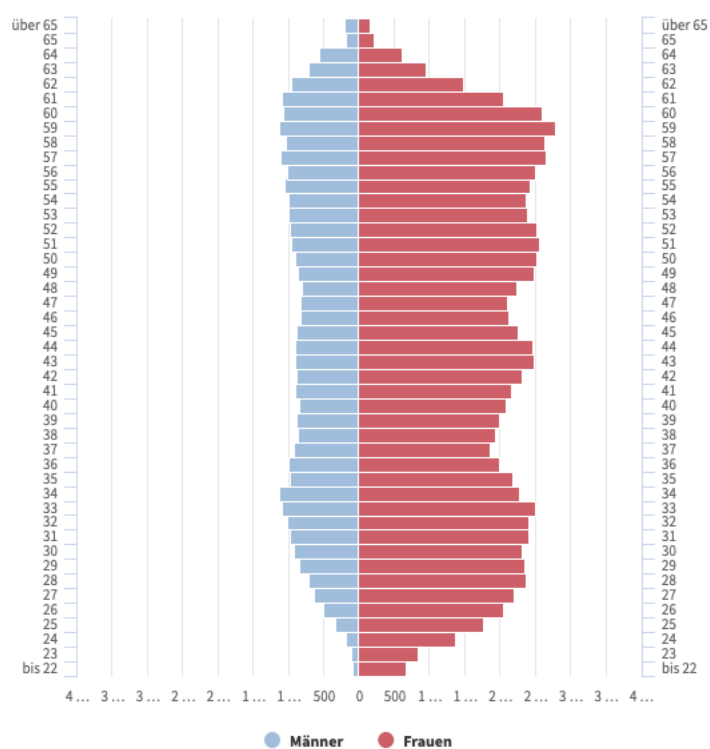


Figure 6: Age distribution of teachers in Austria.

Note: males in blue (left), females in red (right). Source: STATISTIK AUSTRIA, Lehrpersonalstatistik. 22.07.2026. Source: <https://www.statistik.at/atlas/lehrpersonal/> (2026-07-22)

4. Results

This section reports the findings of the DigiSET teacher survey in Austria across four core competence domains — digital teaching, AI, education for sustainable development (ESD), and open educational resources (OER) — as well as specific DigiSET focus topics, followed by an analysis of challenges faced and professional development needs identified by respondents.

4.1. Self-perceived digital teaching competence

4.1.1. Professional engagement (D1-D4)

Figure 7 shows the professional engagement of the participants in relation to digital teaching. All use different digital channels to communicate with learners and colleagues: 43% always, 47% often, others less (10%). 82% explains to always or often use digital technologies when appropriate to work together with colleagues inside and outside my educational organisation.

Concerning their development of digital competence only 14% declares to never/rarely actively develop. 28% explain they are never or rarely aware of and are participating in online training opportunities.

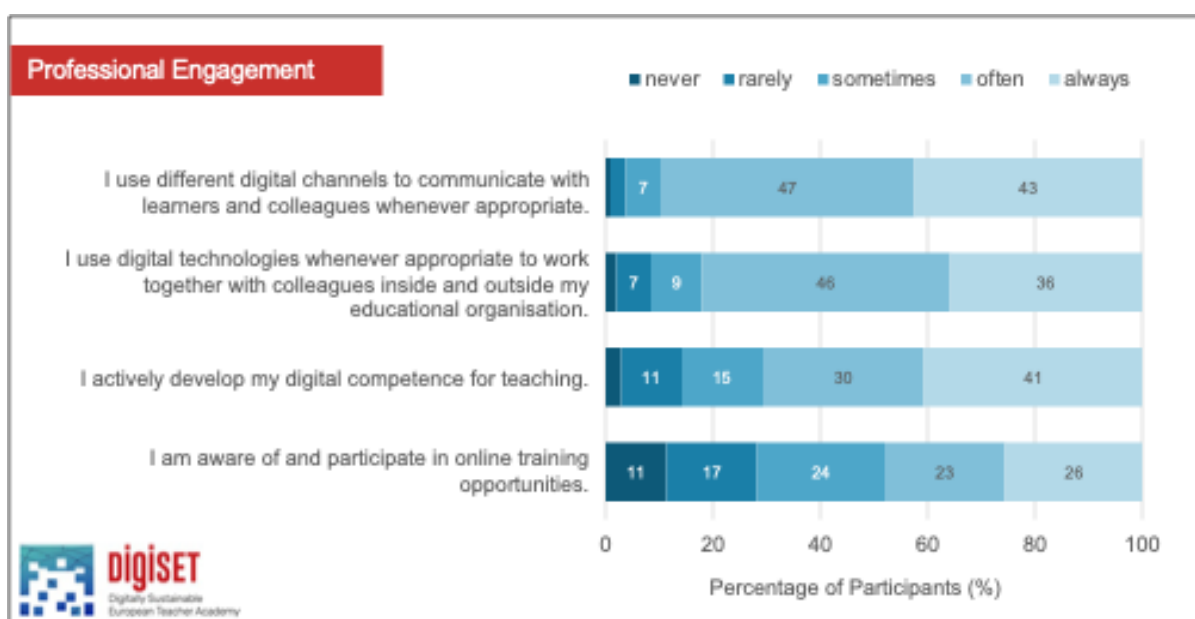


Figure 7: Self-perceived digital teaching competence – professional engagement.

Note: Responses to the DigiSET teacher survey in Austria, utilizing the items from DigCompEdu CheckIn questionnaire, area “professional engagement”, JRC, n.d., p. 11.

4.1.2. Digital resources (D5-D7)

Figure 8 shows how often digital resources are used in digital teaching. 80 % do always or often use different internet sites and search strategies to find and select digital resources, 70 % create own digital resources always or often, whereas only 10% never does this. 88 % claims to always or often effectively protect personal data of the learners. Looking at the respondents who might have needs, we see that 12% never or rarely create their own digital resources, and 9% never or rarely effectively protect personal data while 6% never or rarely search for digital resources.

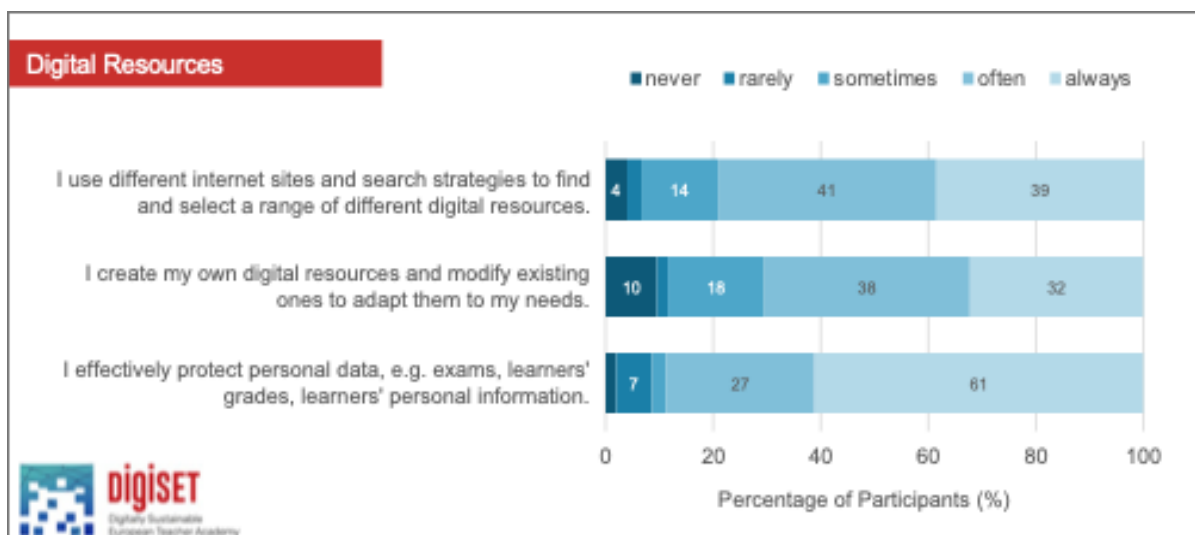


Figure 8: Self-perceived digital teaching competence – digital resources.

Note: Responses to the DigiSET teacher survey in Austria, utilizing the items from DigCompEdu CheckIn questionnaire, area “digital resources”, JRC, n.d., p. 17.

4.1.3. Teaching and learning (D8-D11)

Figure 9 addresses how the respondents deal with specific teaching and learning issues. So, a large majority “carefully consider how, when and why to use digital technologies in classrooms (...) so that they are used with added value”: 85% does this always or often. About a half (56%) always or often follow learners’ activities in the online environments used at school – and 20 % rarely or never. In group work, again about a half (57%) use digital tools. Compared with the first items, it is not as common to use digital tools to allow learners to plan, document and monitor their learning themselves: 31% use digital tools for this purpose never or rarely, and 49% use always or regularly.

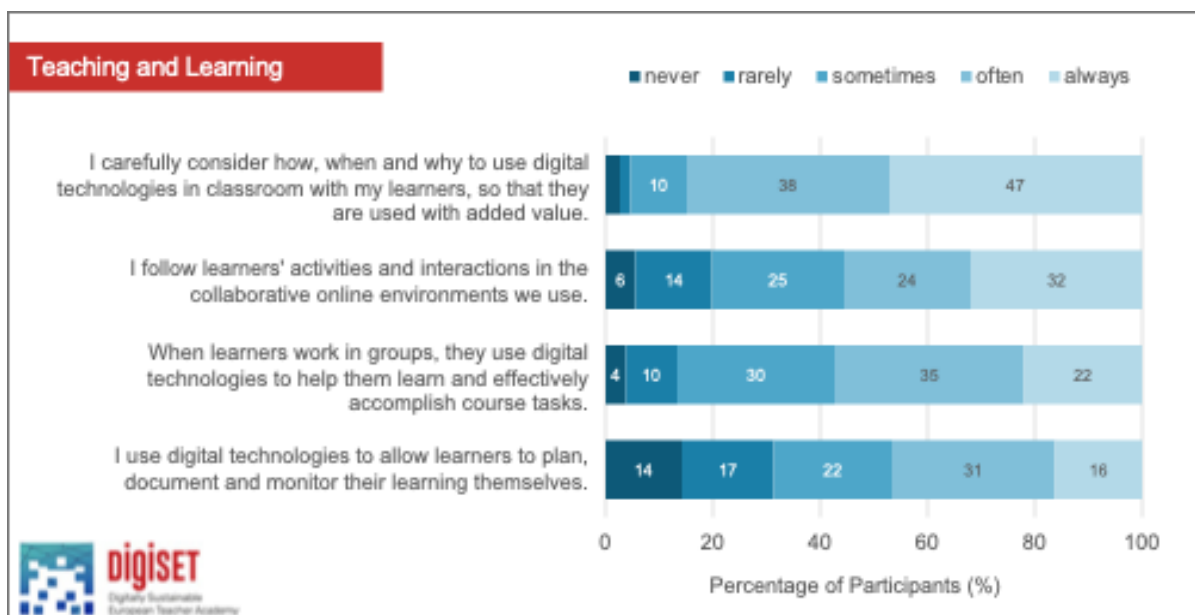


Figure 9: Self-perceived digital teaching competence – teaching and learning.

Note: Responses to the DigiSET teacher survey in Austria, utilizing the items from DigCompEdu CheckIn questionnaire, area “teaching and learning”, JRC, n.d., p. 21.

4.1.4. Assessment (D12-D14)

Figure 10 shows items concerning assessment: Accordingly, 37% of respondents—more than one-third—never or rarely use digital assessment tools, while a similar proportion (36%) use them often or always. The use of data to identify learners requiring additional support is more common: 46% of respondents do so often or always, compared with 34% who do so rarely or never. Similarly, nearly half of the respondents (44%) often or always use digital technologies to provide effective feedback, whereas 28% rarely or never do so.

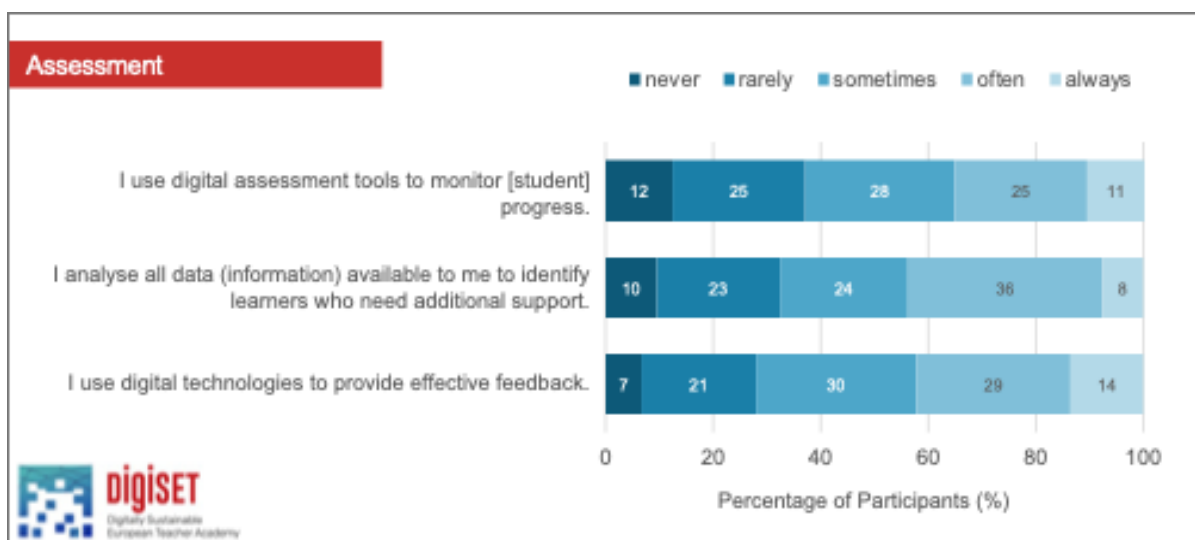


Figure 10: Self-perceived digital teaching competence – assessment.

Note: Responses to the DigiSET teacher survey in Austria, utilizing the items from DigCompEdu CheckIn questionnaire, area “assessment”, JRC, n.d., p. 27.

4.1.5. Empowering learners (D15-D17)

Figure 11 illustrates answers concerning items which are addressing “empowering learners”. According to the results, a huge majority of 78% takes always or often into account and address potential practical or technical difficulties when creating digital assignments. Digital technologies are as well used by less than a half (45%) always and often to offer learners personalised learning opportunities, 23 % never or rarely does. To activate participation in class, the usage of digital technologies is again more common – 64%, nearly two third, does this always or often, only 13 % never or rarely.

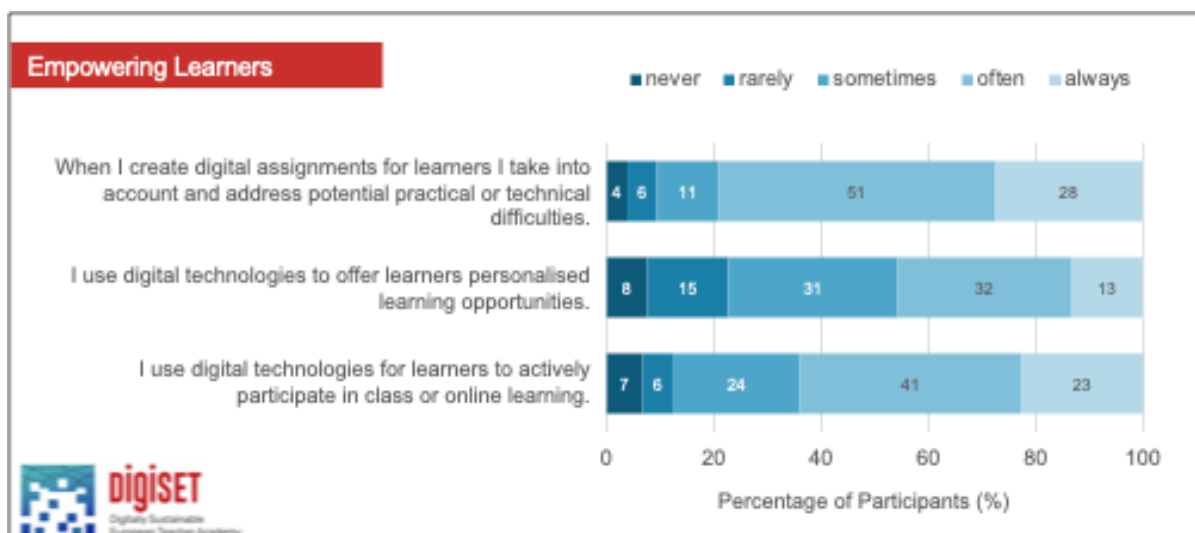


Figure 11: Self-perceived digital teaching competence – empowering learners.

Note: Responses to the DigiSET teacher survey in Austria, utilizing the items from DigCompEdu CheckIn questionnaire, area “empowering learners”, JRC, n.d., p. 32.

4.1.6. Facilitating learners' digital competence (D18-D22)

Figure 12 presents answers on items relating to facilitation of learners' digital competence. How to use digital technology safely and responsible is the most relevant item: 69% does this always or often, only 12 percent never or rarely. Similar relevant is to teach learners how to assess reliability of information, which is done by 67% always or often. A little bit less regularly the respondents encourage learners to use digital technology to solve problems creatively (65% always or often). Assignments which require learners to create digital content are often or always set by 45% of the respondents, course tasks which requires communication and collaboration 36%. Here the group of respondents who answer never is comparably big with about 14%.

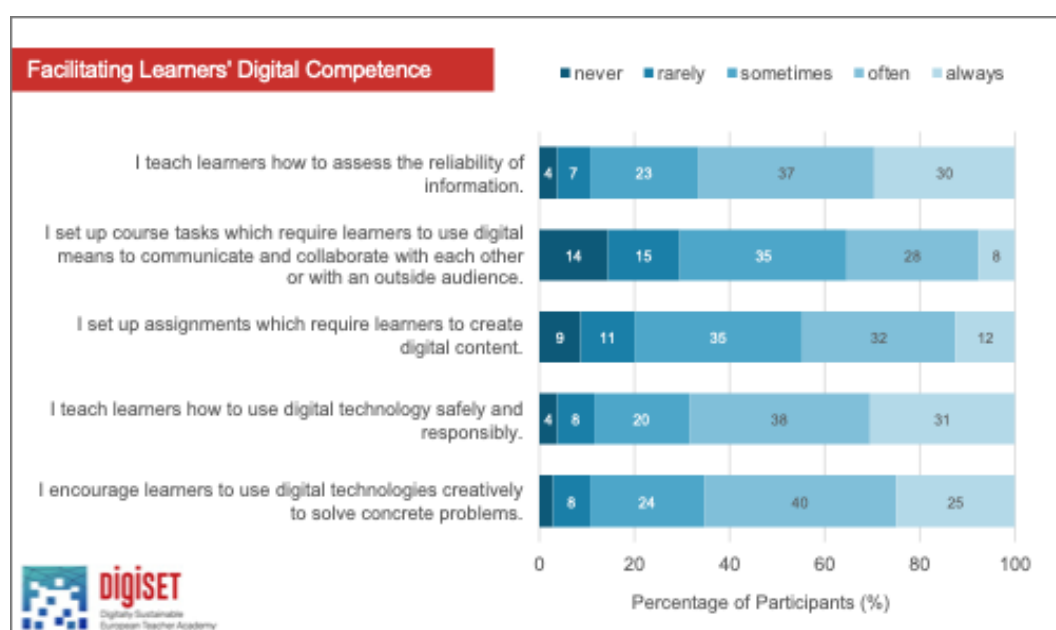


Figure 12: Self-perceived digital teaching competence – facilitating learners' digital competence.

Note: Responses to the DigiSET teacher survey in Austria, utilizing the items from DigCompEdu CheckIn questionnaire, area “facilitating learners's digital competence”, JRC, n.d., p. 37.

4.2. Self-perceived AI competence

4.2.1. AI knowledge (A1-A4)

Figure 13 presents respondents' confidence in their knowledge of AI. A large majority feel very or completely confident in creating content with AI (80%) and explaining what AI is (81%). Notably, no respondents report feeling unconfident about explaining AI. However, confidence is lower regarding generative AI: 60% feel very or completely confident explaining it, while 18% feel not at all or only slightly confident.

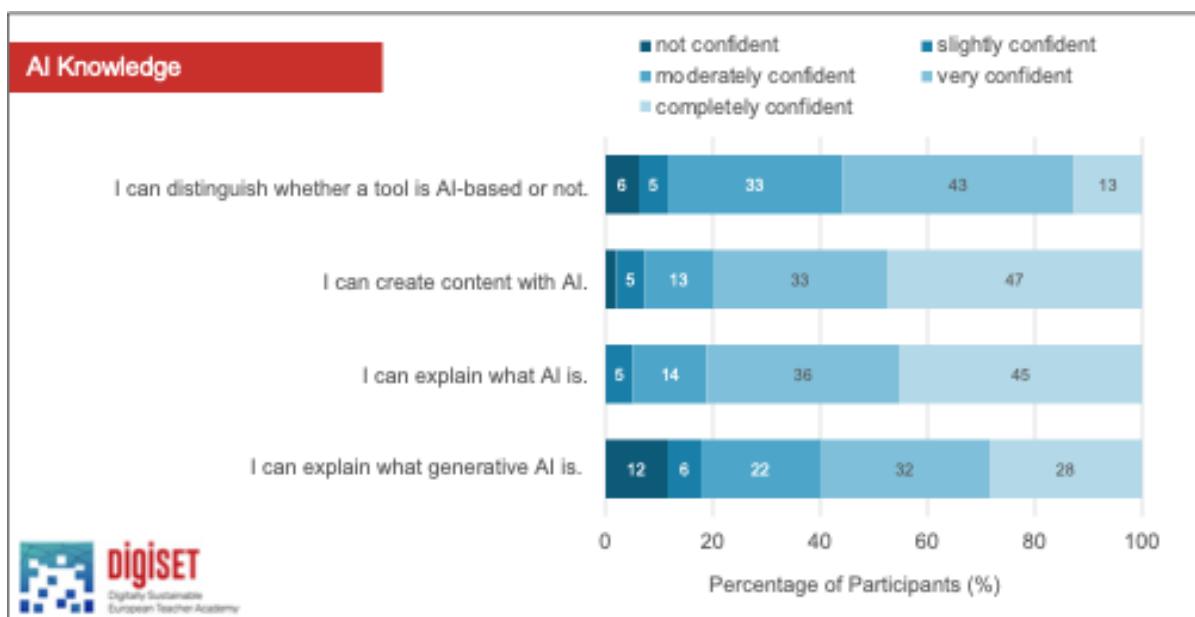


Figure 13: Self-perceived AI competence – AI knowledge.

Note: Responses to the DigiSET teacher survey in Austria, utilizing items from Chiu, Ahmad, & Çoban (2025) section “AI knowledge”.

4.2.2. AI pedagogy (A5-A8)

Figure 14 shows that at least half of the respondents feel very or completely confident across all AI pedagogy items, while the proportion who feel not at all or only slightly confident ranges from approximately 7% to 33%. More specifically, two-thirds feel very or completely confident in selecting an AI tool that enhances the teaching of subject content in a lesson. Furthermore, 59% feel very or completely confident in selecting an AI tool for classroom use, 58% in appropriately combining subject content, AI tools, and pedagogical approaches, and 51% in helping others design such learning activities.

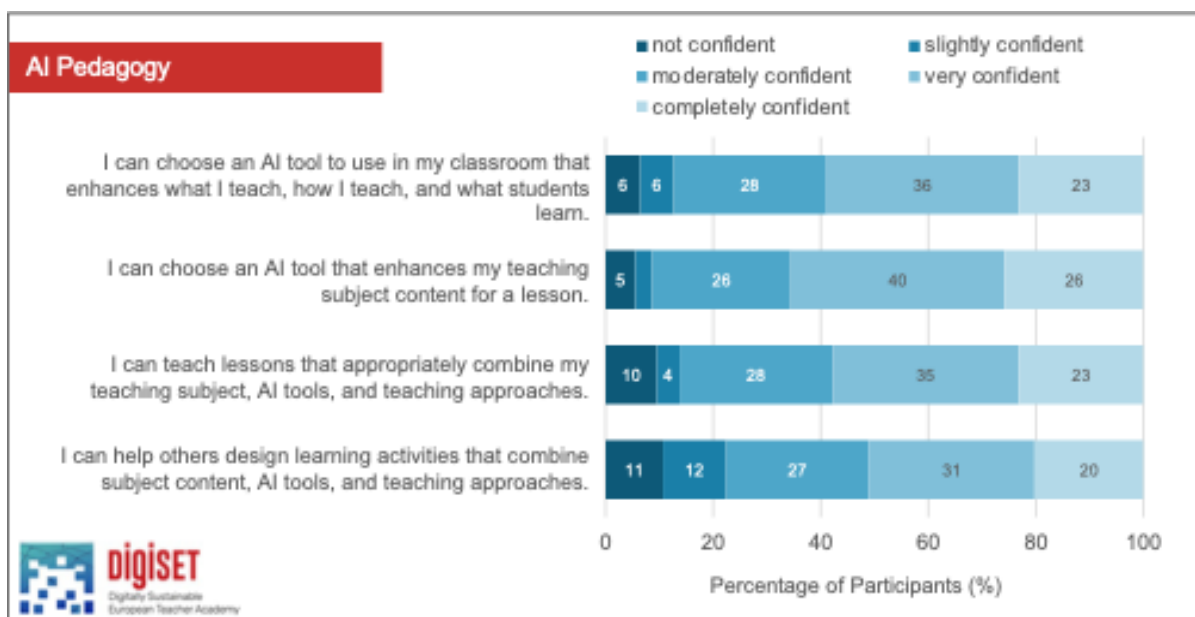


Figure 14: Self-perceived AI competence – AI pedagogy.

Note: Responses to the DigiSET teacher survey in Austria, utilizing items from Chiu, Ahmad, & Çoban (2025) section “AI pedagogy”.

4.2.3. AI assessment (A9-A12)

Figure 15 illustrates answers concerning AI assessment competences. Here, the confidence is comparably smaller, more than one-third feels very or completely confident and about 29%-43% not or only slightly confident. In details, 29% do not feel or only slightly feel confident to use an AI tool to foster assessment for learning, or to design an assessment approach to improve student learning in an AI-based environment. One-third is not or only slightly to assess student learning in an AI-based environment, and even 44% does not feel confident or only slightly confident to use an AI tool to grade an assignment.

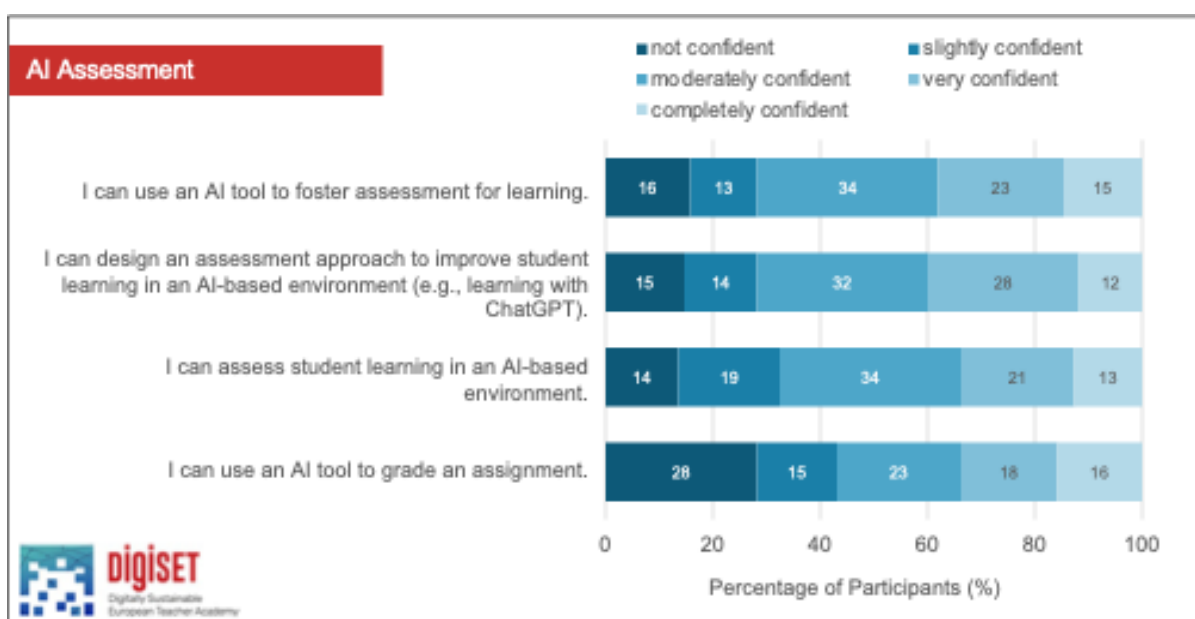


Figure 15: Self-perceived AI competence – AI assessment.

Note: Responses to the DigiSET teacher survey in Austria, utilizing items from Chiu, Ahmad, & Çoban (2025) section “AI assessment”.

4.2.4. AI ethics (A13-A16)

Figure 16 presents respondents' confidence in teaching AI ethics. Although the majority feel very or completely confident across the different items, a notable proportion feel not at all or only slightly confident. This includes teaching students about AI ethics (10%), protecting sensitive content from AI tools (20%), safeguarding students' health and well-being when using AI tools (10%), and teaching students to behave safely and responsibly when learning with AI tools (15%).

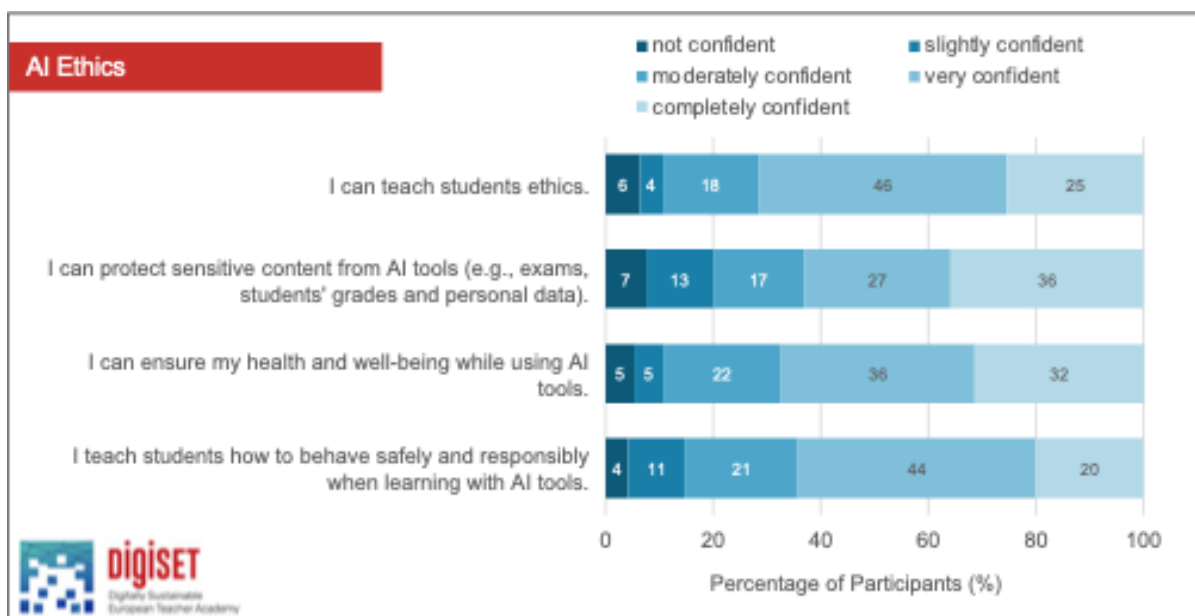


Figure 16: Self-perceived AI competence – AI ethics.

Note: Responses to the DigiSET teacher survey in Austria, utilizing items from Chiu, Ahmad, & Çoban (2025) section "AI ethics".

4.2.5. AI human-centred education (A17-A20)

Figure 17 presents respondents' confidence regarding human-centred education in the context of AI. Across all items, more than two-thirds report feeling very or completely confident, with proportions ranging from 67% to 78%. Compared with other AI-related areas, fewer respondents feel not at all or only slightly confident. Nevertheless, this includes 6% who lack confidence in recognising human responsibility for biases in AI systems, 12% in explaining AI's impact on society, 8% in explaining the risks associated with an AI tool, and 10% in explaining its benefits.

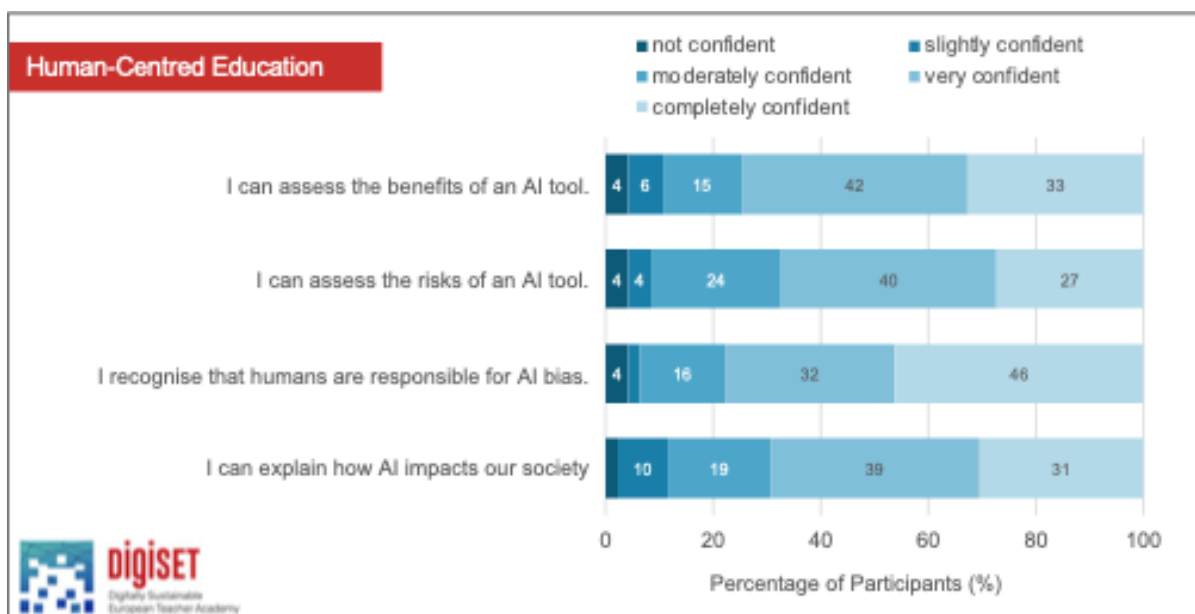


Figure 17: Self-perceived AI competence – human-centred education.

Note: Responses to the DigiSET teacher survey in Austria, utilizing items from Chiu, Ahmad, & Çoban (2025) section “human-centred education”.

4.2.6. AI professional engagement (A21-A24)

Figure 18 addresses professional engagement items in relation to AI. About a half of the respondents feels very or completely confident to search and select of different AI tool (63%), look for professional development on the topic (56%), share own experiences with other teachers (49%) or love to help my colleagues design teaching activities with AI (50%).

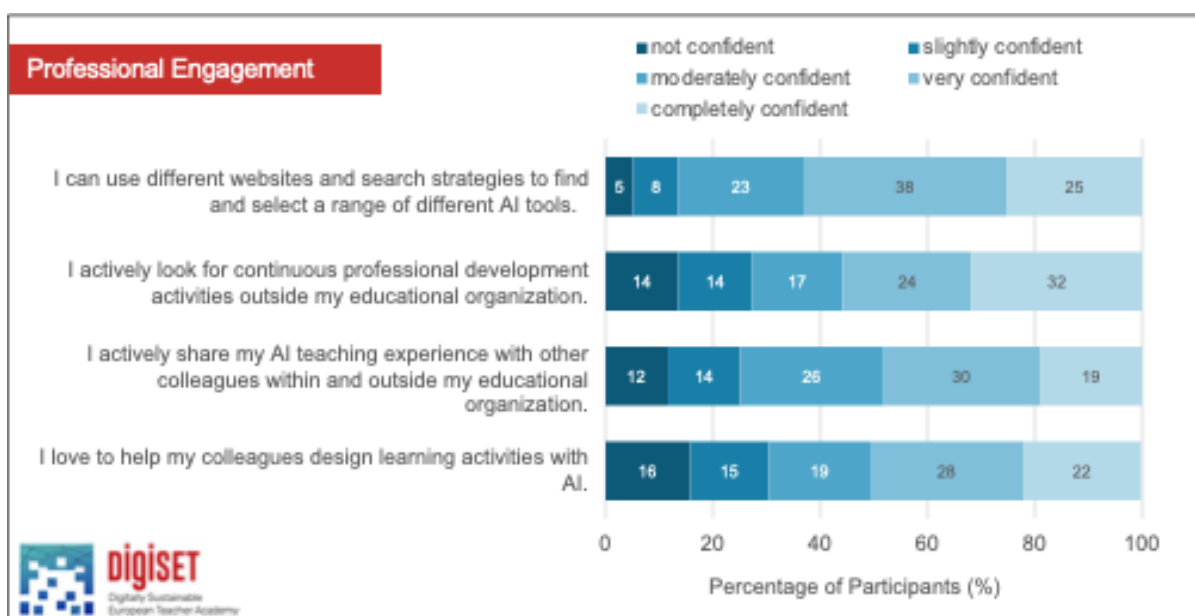


Figure 18: Self-perceived AI competence – professional engagement.

Note: Responses to the DigiSET teacher survey in Austria, utilizing items from Chiu, Ahmad, & Çoban (2025) section “professional engagement”.

4.3. Self-perceived education for sustainable development (ESD) competence

4.3.1. Systems and critical thinking (S1-S3)

The questions on systems and critical thinking are presented in 4.5. (p. 28) as they are specifically addressing a DigiSET core topic.

4.3.2. Pedagogical practice for ESD (S4-S7)

Figure 19 illustrates how the respondents apply pedagogical practices for ESD in their teaching. Generally, 82% agree (strongly) to integrate sustainability topics into the teaching practice. About a half use participatory and learner-centred teaching approaches when addressing sustainability (55%). 56% of the participants design learning activities that promote active engagements with sustainability challenges. 48 % agree (strongly) to use digital technologies when engaging learners with real-world sustainability challenges. Concerning this last item, 27% (strongly) disagree doing so.

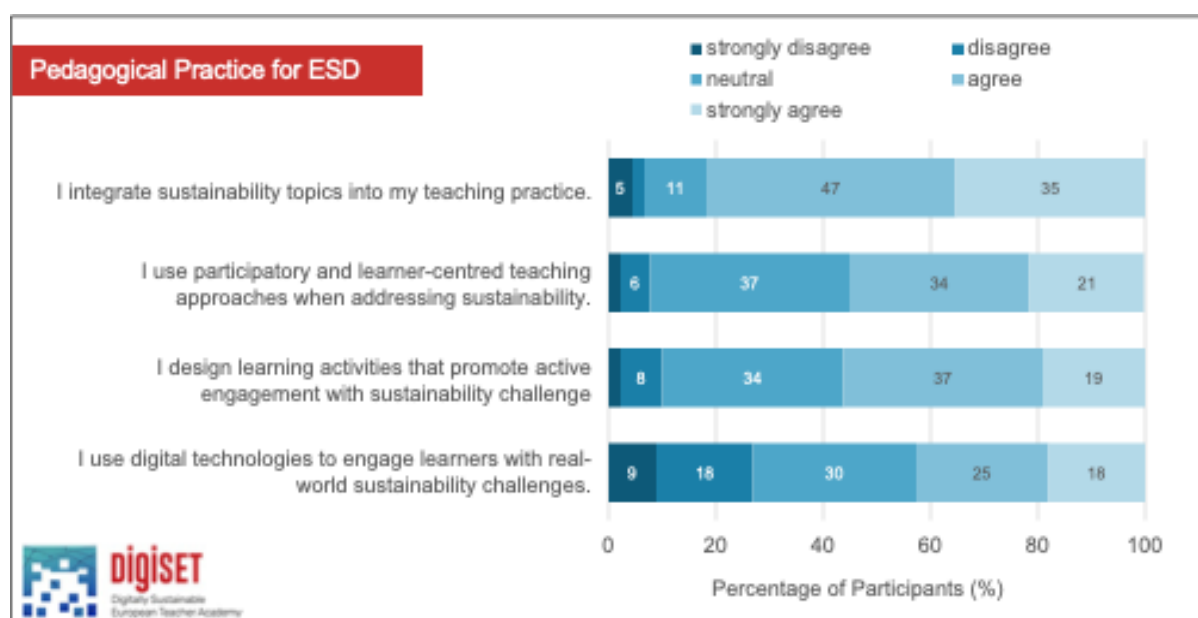


Figure 19: Self-perceived ESD competence – pedagogical practice for ESD.

Note: Responses to the DigiSET teacher survey in Austria, items were created for the DigiSET survey.

4.3.3. Values and responsibility (S8-S10)

Figure 20 shows items related to values and responsibility in ESD. According to the respondents 92% (strongly) agree to promote values such as responsibility, equity and respect for diversity in their teaching, and 82% (strongly) agree to support learners in developing a sense of responsibility for sustainable development, 68% (strongly) agree to consider ethical implications of sustainability issues. So, the percentage of respondents which answers to (strongly) disagree on these ESD values and responsibility items is rather low (2%-7%).

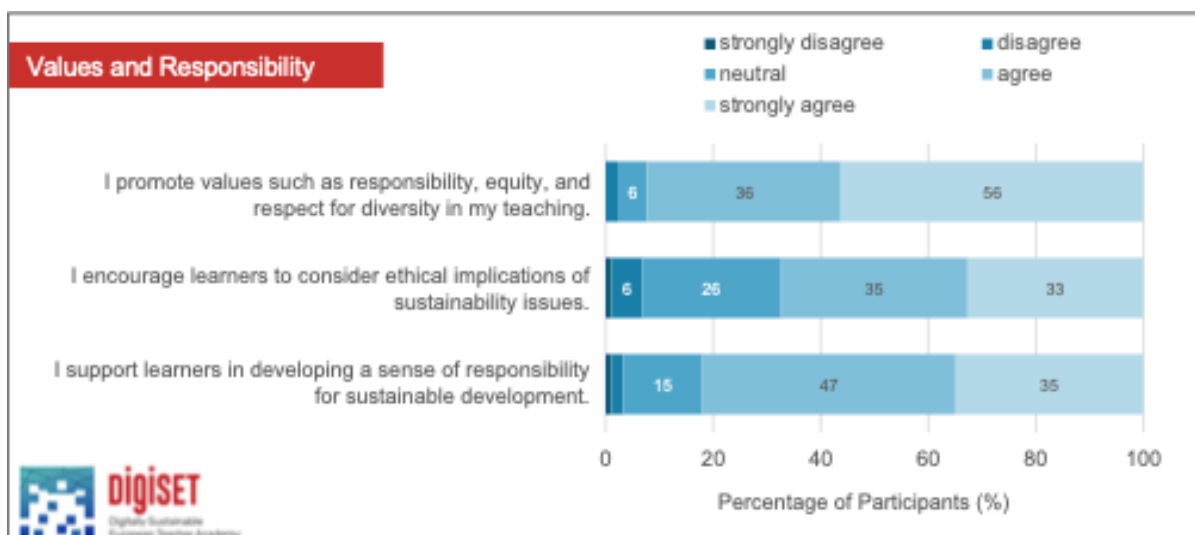


Figure 20: Self-perceived ESD competence – values and responsibility.

Note: Responses to the DigiSET teacher survey in Austria, items were created for the DigiSET survey.

4.3.4. Reflective and action-oriented practice (S11-S13)

Figure 21 presents respondents' engagement in reflective and action-oriented sustainability practices. More than two-thirds (68%) agree or strongly agree that they reflect on their teaching practices in relation to sustainability and seek continuous improvement. Furthermore, 58% feel confident facilitating discussions on complex or controversial sustainability issues, while 68% support learners in applying sustainability knowledge to real-life situations.

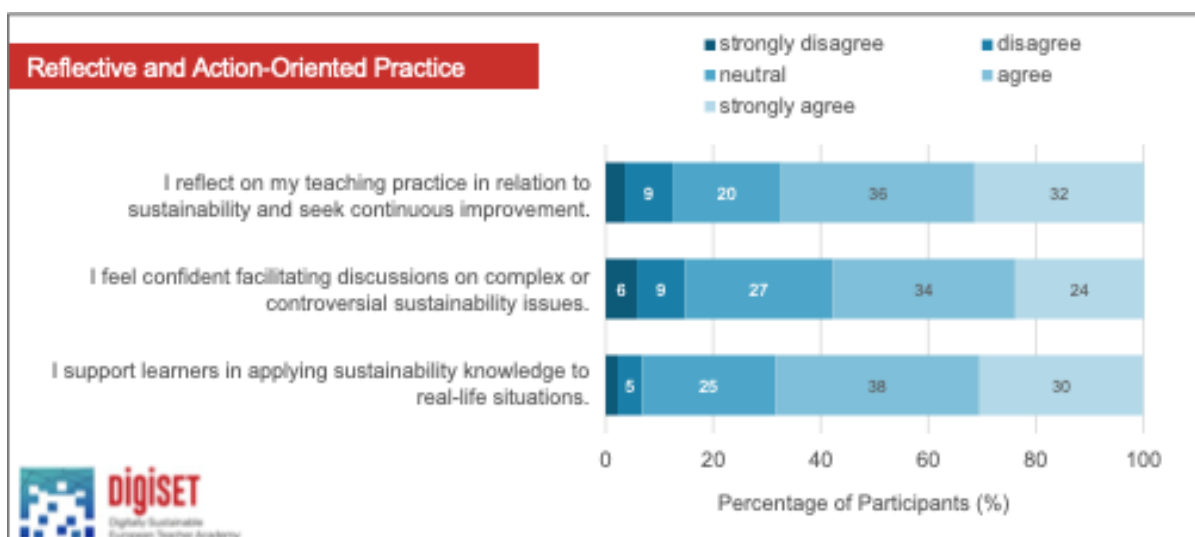


Figure 21: Self-perceived ESD competence – reflective and action-oriented practices.

Note: Responses to the DigiSET teacher survey in Austria, items were created for the DigiSET survey.

4.4. Self-perceived Open Educational Resource (OER) competence (O1-O5)

Figure 22 shows responses to OER-related items. According to the respondents' self-evaluations, 60% already have experience using OER, 56% agree or strongly agree that they have sufficient knowledge of intellectual property rights to understand

OER, and 67% agree or strongly agree that they have the ICT skills required to adopt and use OER. Furthermore, 48% adopt OER in their teaching, and 55% agree or strongly agree that their OER-related knowledge and competences help them participate in or adopt OER. Regarding respondents' needs, the results show that between 20% and 36% disagree or strongly disagree with these statements.

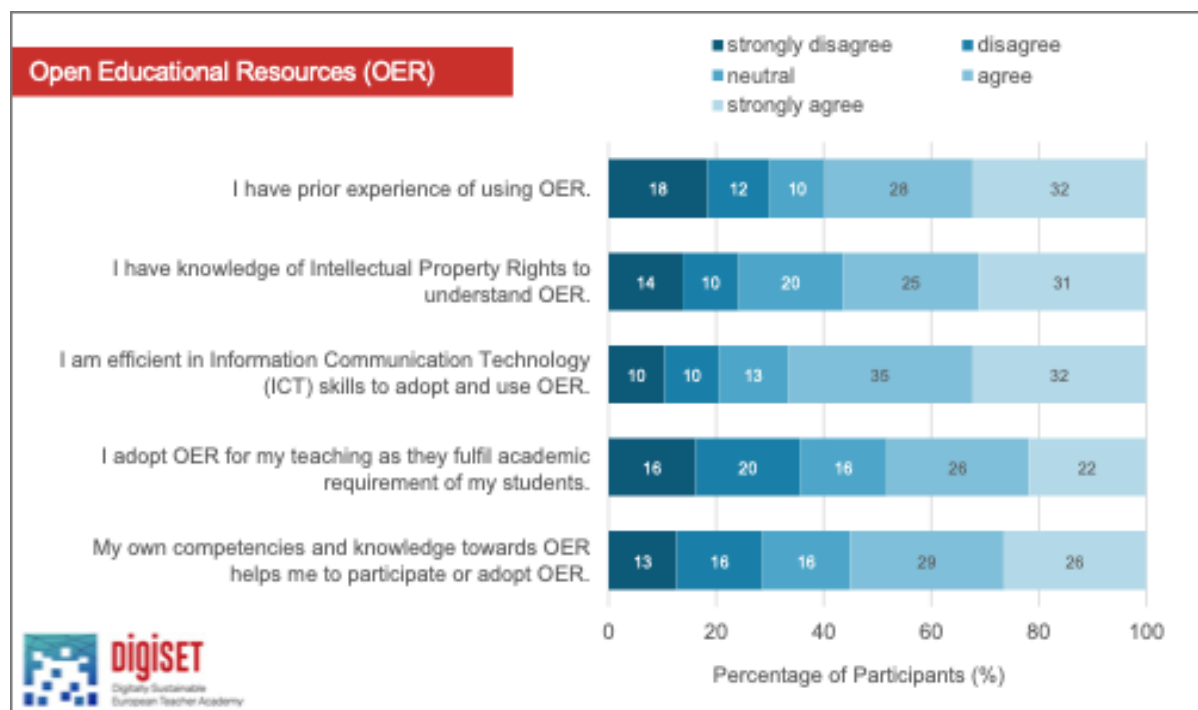


Figure 22: Self-perceived OER competence.

Note: DigiSET teacher survey results for Austria, utilizing a subset of items from Mishra et al. (2016).

4.5. Self-perceived competences for specific DigiSET topics

In the following, we describe responses addressing the four specific DigiSET topics which are gender-unbiased AI in teaching, systems thinking for sustainability in education, AI for adaptive learning and inclusive teaching practices.

4.5.1. Adaptive AI use (AD1, AD2)

Figure 23 shows two items addressing AI for adaptive learning. Here, 48% are (very) confident using AI tools to personalise learning for individual students and 48% know how to use AI for differentiated instructions based on student needs. On the contrary, 33%, so one-third does not or is only slightly confident to use AI tools for this purpose, and 28% does not know how to use AI for differentiate instructions.

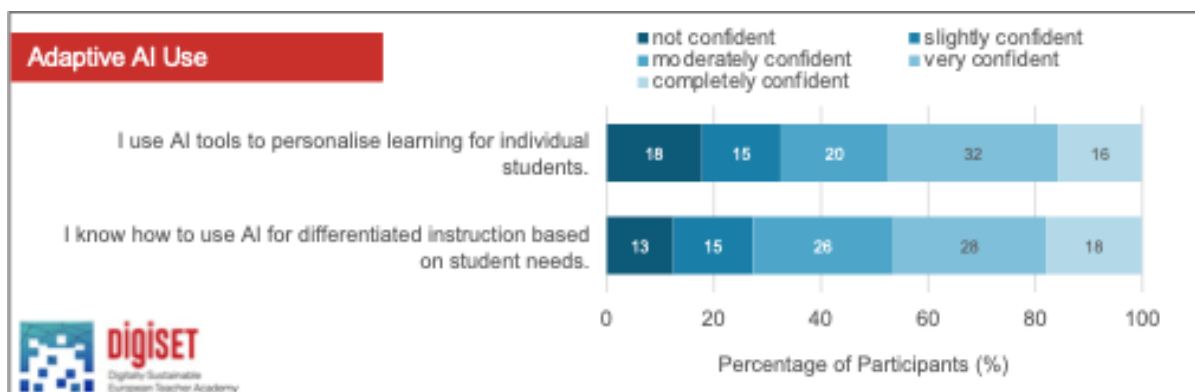


Figure 23: Adaptive AI use.

Note: Responses to the DigiSET teacher survey in Austria, items were created for the DigiSET survey.

4.5.2. Gender bias in AI (GD1, GD2)

Figure 24 shows that 74% feels aware of gender bias in AI-generated content – and 24% not or only slightly confident with this. Again, about a half (49%) knows how to address gender stereotypes when using AI in teaching – and 21% does not feel confident or only slightly confident.

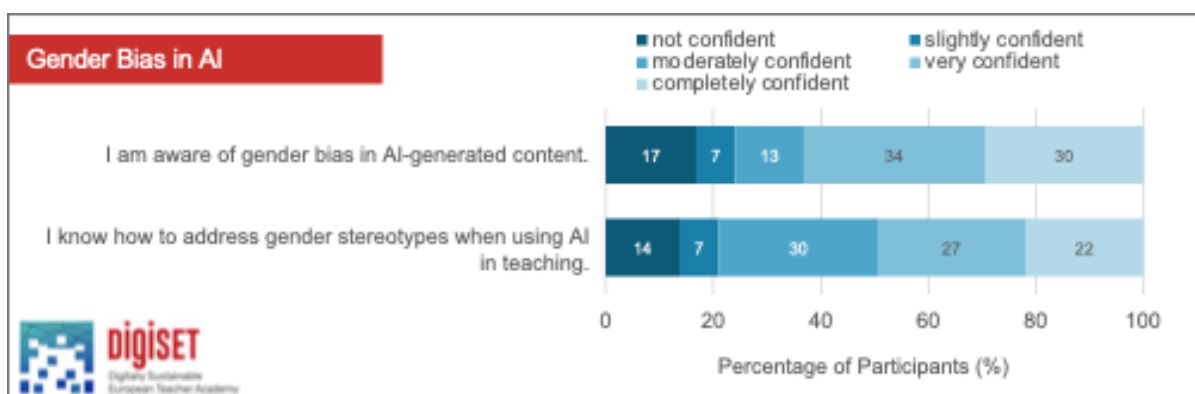


Figure 24: Gender bias in AI.

Note: Responses to the DigiSET teacher survey in Austria, items were created for the DigiSET survey.

4.5.3. Inclusive practices for students with learning disabilities (I1, I2)

Figure 25 presents that 49% of the respondents use digital tools to support students with learning difficulties always or often, and one-third (34%) adapts digital learning materials often or always. 22% use digital tools for this purpose rarely or never, 43% never or rarely adapt digital learning materials for students with special educational needs.

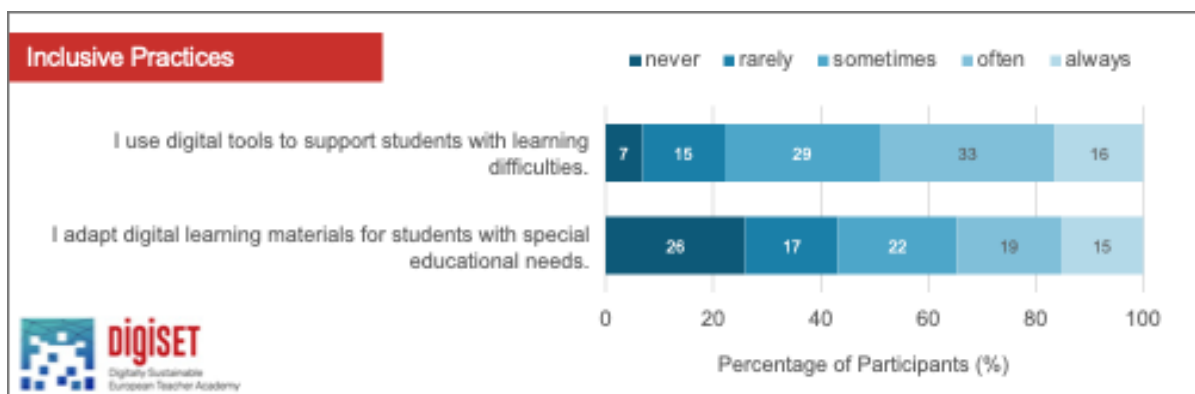


Figure 25: Inclusive practices.

Note: Responses to the DigiSET teacher survey in Austria, items were created for the DigiSET survey.

4.5.4. System Thinking (S1-S3)

The Figure 26 focuses on systems and critical thinking and presents a section of the questions related to Education for Sustainable Development (see 4.3, p. 26).

Accordingly, 69% agree (strongly) to help learners to understand the interconnections between environmental, social and economic aspects of sustainability, 87% to encourage learners to critically reflect sustainability-related issues, and 65% to support learners in analysing complex sustainability problems from multiple perspectives.

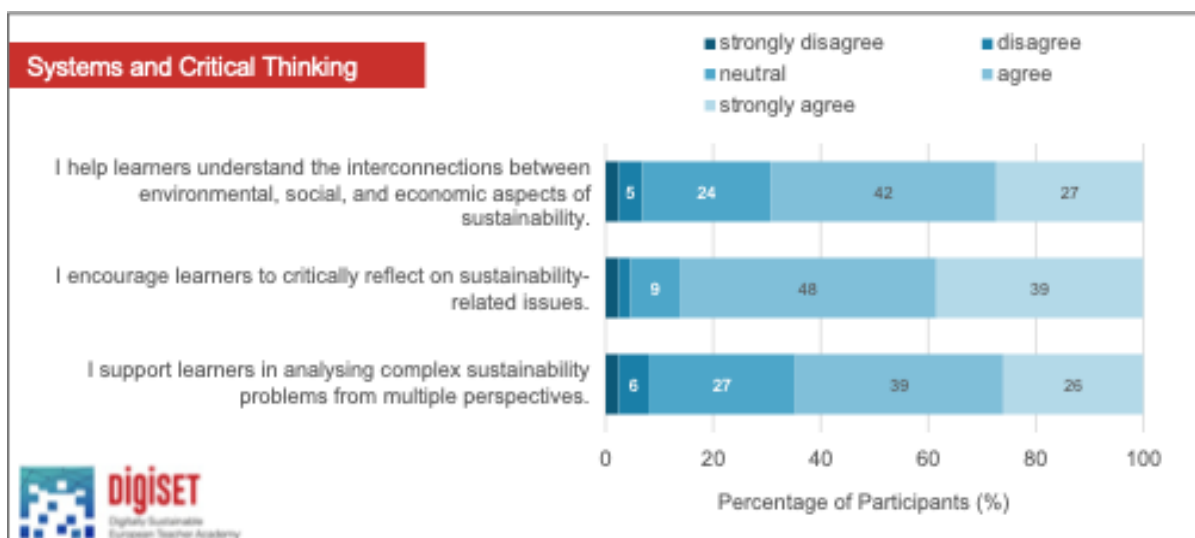


Figure 26: Education for sustainable development – systems and critical thinking.

Note: Responses to the DigiSET teacher survey in Austria, items were created for the DigiSET survey.

4.6. Challenges faced in integrating digital teaching and sustainability in teaching, needed competences and existing barriers

This section focuses on challenges faced in integrating digital teaching and sustainability in teaching, and professional development needs related to digital and sustainable teaching.

4.6.1. Challenges faced in integrating digital technologies and sustainability into teaching (Q1)

The first open question in the DigiSET survey addresses challenges faced in integrating digital technologies and sustainability in teaching, 47 respondents answered to this question. Several respondents describe feeling unable to keep up with the rapid pace of technological change, particularly around AI. Others note that integrating digital tools often increases preparation time rather than reducing it. It is worth noting, however, not all respondents framed this as a personal limitation — some focused more on systemic conditions.

Representative quotes (translation from original German):

- “I simply lack the time to engage intensively with it. And without sufficient engagement, I don't feel well prepared.”
- “The rapid speed of progress that digital technologies have reached since the release of AI, and increase almost daily. I'm subscribed to several newsletters, and just reading through them exceeds my available time almost daily.”
- “Digital technology and equipment often contradict the idea of saving time. In practice, the opposite is often the case, as it takes longer, for example, until all student devices are ready to use.”
- “High preparation effort.”

Several respondents — though not a majority — point to inadequate or unreliable school infrastructure. Issues mentioned include unstable Wi-Fi, insufficient student devices, broken hardware, and restricted software environments. Some also note that teachers are required to use their own personal devices because school equipment does not function reliably. Again, this appears to reflect the situation at specific schools rather than a universal condition. Some representative quotes are (translation from original German):

- “Poor technical equipment in the school, no stable functioning Wi-Fi, no stable connection option to the projector in the classroom, required use of own devices because devices in the school don't work reliably.”
- “School equipment, blocking apps or similar.”
- “Some students forget their digital devices, or they are not charged, are in for repair... Lack of time to try out something new.”
- “No tablets or laptops for students. No good Wi-Fi.”

A smaller group of respondents described a perceived skills deficit — both among colleagues and among students. Interestingly, one respondent challenged the assumption that students are naturally proficient with digital tools, suggesting that the term “digital natives” applies mainly to smartphone use rather than productive work with computers. However, this observation was made by only a few individuals and may not reflect the broader picture: “lack of competences among students ('Digital Natives' --> only applies to 'smartphone swiping' -> actual 'working' with digital devices must be trained from scratch and very laboriously).”

Some respondents expressed reservations about the uncritical adoption of digital tools. Concerns ranged from students' excessive screen time and concentration

difficulties to the pedagogically questionable use of AI. One respondent questioned whether digital technologies are genuinely necessary in the education system at all: “Do you know how much screen time our children and adolescents have? Our children have massive concentration and reading difficulties. It would be urgently necessary to protect our children from the digital world. Children should (again) learn to read, write, and do mental arithmetic!” It should be emphasised that other respondents took a more constructive stance, seeking ways to integrate technology meaningfully, exemplarily: “One of the biggest challenges for me is integrating digital technologies meaningfully and didactically appropriately into teaching, without them becoming an end in themselves.”

A few respondents pointed to structural barriers beyond the classroom: the absence of sustainability as a curricular goal, limited institutional willingness to invest, licensing costs, a lack of clear guidance on where to find relevant information or as well as: “A lack of awareness for digitally sovereign solutions among decision-makers.”

4.6.2. Competences that would help to address these challenge (Q2)

38 respondents answered the open-ended question on competences that are needed to address the challenges mentioned in the last question. Interestingly, respondents very often not directly address needed competences: Perhaps unsurprisingly given the earlier findings on challenges, time emerges as a central theme when respondents consider what support they would need. Several respondents explicitly mention the need for time to explore new applications, create materials, or attend training. Notably, some frame this not as a competence issue but as a structural constraint. Some representative quotes (translation from original German) are:

- “More time to try out new apps and create materials.”
- “I see myself already in the best possible work situation. PS: Apart from the fact that if you could actually create 48-hour days, then the producers of the news would also have 48 hours available and we would be back at status quo.”
- “I would not speak of competences, I would emphasise the working conditions here. If I wanted to, I could try out many things. But that's only possible if I have a second or even one-third teacher with me.”

Many respondents call for improved access to training, coaching, and ongoing support. Some note that they already possess competences through numerous training sessions but struggle to implement them due to time constraints. A minority suggests that institutional support for teachers pursuing further education is inadequate. Several respondents shift the focus away from personal competences towards systemic investments. They argue that stable equipment, specialised rooms (e.g., STEM rooms with 3D printers, laser cutters), and adequate financing are prerequisites that lie beyond teachers' control. Some explicitly state that funding is a matter for education policy, not for individual teachers.

Nevertheless, some respondents articulate clear wishes regarding particular skill sets, particularly related to artificial intelligence. Requests range from guidance on using AI as a learning support tool to methods for assessing group work where

distinguishing between student and AI contributions proves difficult. Media pedagogical and technical competences also feature in these responses. Some representative quotes are (translation from original German):

- “Helpful would be especially deepened media-pedagogical and technical competences to be able to use digital tools purposefully and efficiently in teaching. Equally important are knowledge about how sustainability can be conveyed in a practical and cross-curricular manner.”
- “I would like help showing students how to use AI as learning support and how to use AI for differentiated teaching.”
- “Methods for assessing group work, because it is difficult to determine which part is personal, which part is from AI.”
- “Competences regarding possibilities of AI-guided learning tools.”

A small group of respondents expresses preference for practical, pre-tested resources rather than abstract competences. Suggestions include curated tool selections suitable for specific grade levels, consolidated information via newsletters, and concrete teaching materials that meaningfully connect digital education with sustainability.

Few respondents mention the need for theoretical knowledge concerning rights, copyright, and legal frameworks — alongside technical prerequisites and, notably, practical application. And a small number of respondents indicate uncertainty about what competences might help or deflect the question towards structural conditions. Some responses suggest ambivalence about whether additional competences alone would suffice (“Oh God, if I knew that.”, “I don’t think I can change that.”)

4.6.3. Professional development needs related to digital and sustainable teaching (P1)

Figure 27 shows that inclusive digital teaching with 48% is the most needed training area of the DigiSET topic options that were asked, 39% are see needs in using adaptive learning tools, 38% using AI in teaching. Integrating sustainability into teaching with 16% and addressing gender bias in AI with 15% are of – relative – less need.

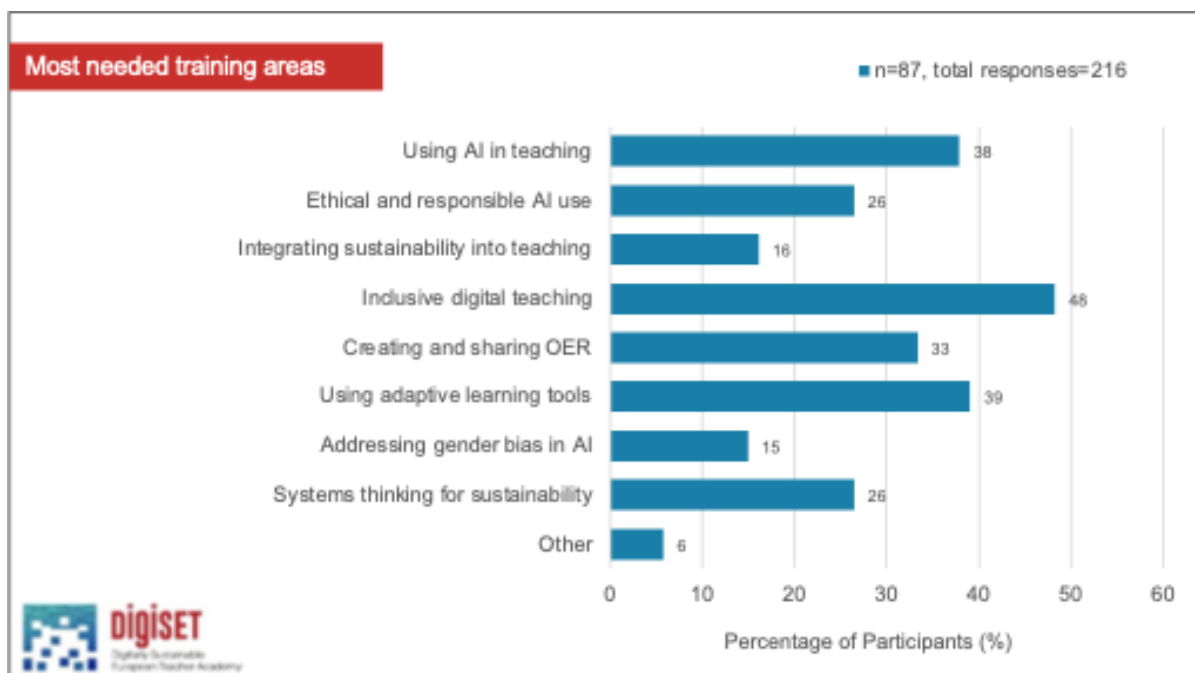


Figure 27: Most needed training areas.

Note: Responses to the DigiSET teacher survey in Austria. Note: Multiple responses were allowed; therefore, totals exceed 100%.

4.6.4. Main barriers to professional development (P2)

Figure 28 shows the main barriers that hinder professional development. From the options, 73% chose lack of time as main barrier, 40% lack of available training, 38% lack of suitable resources/materials, 30% lack of institutional support, and 20% lack of infrastructure.

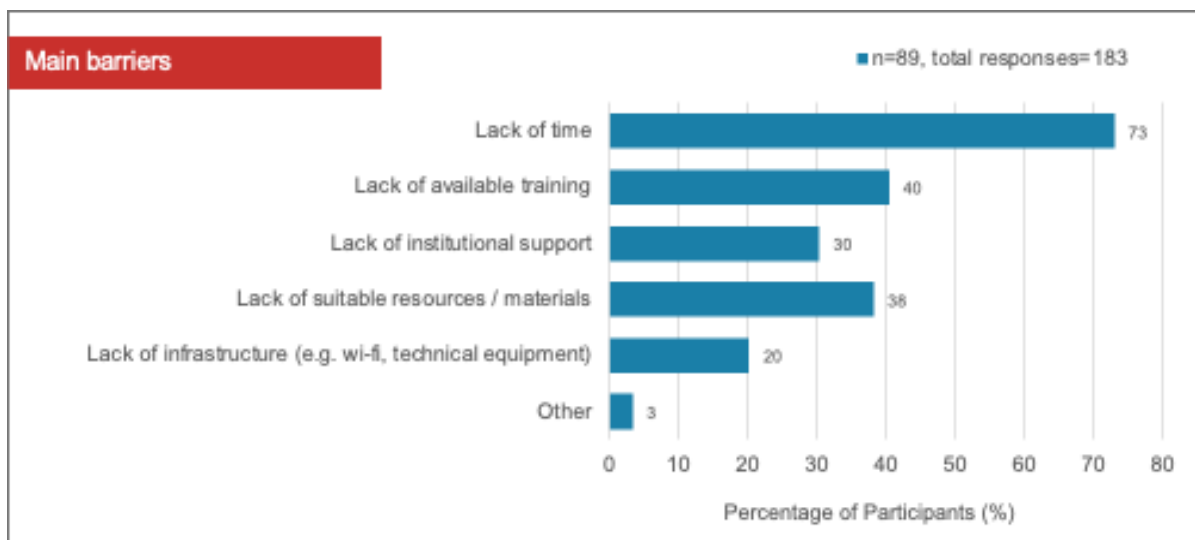


Figure 28: Main barriers to professional development in the addressed areas.

Note: Responses to the DigiSET teacher survey in Austria. Note: Multiple responses were allowed; therefore, totals exceed 100%.

4.6.5. Additional Insights and comments (Q3)

Question 3 asked for any additional comments on the survey's topic. 20 respondents answered this open-ended question (with 14 substantive responses and 6 indicating

“no comment”). The following analysis identifies recurring themes across these responses, but of course are not representative for the respondents, as each topic was addressed not often.

- First, respondents expressed reservations about the survey instrument itself, questioning whether the terminology and questions aligned with classroom reality or whether AI was used in creating the questionnaire.
- Several respondents voiced interest in accessible information platforms, whether simplified websites, international exchange spaces, or online training formats. Some drew inspiration from past experiences with early pedagogical discussion forums and envisioned similar collaborative spaces for today's educators.
- Some respondents used the opportunity to share broader reflections on the balance between digital and analogue approaches, expressing both optimism about future developments and caution against uncritical enthusiasm for new technologies such as AI. These comments suggest nuanced perspectives rather than straightforward positions, e.g. “The topics digitalisation and sustainability will play an even bigger role in the education sector in the future. Importantly, teachers should be accompanied not only with expectations but also with sufficient support, practice-oriented training and suitable infrastructure”.
- A couple of respondents highlighted how everyday practical obstacles lead to frustration and rejection of digital tools among colleagues. These remarks align with earlier findings on infrastructure challenges and suggest that everyday technical failures contribute significantly to attitudes about digitalisation.
- A few respondents pointed towards political and structural responsibility, calling for mandatory training, open-source standards, and improved working conditions rather than focusing solely on individual teacher competences.
- Finally, some respondents offered encouraging comments, acknowledging the importance and interest value of the survey itself, e.g. “I wish you lots of success!”

5. Discussion

This section synthesizes and critically discusses the key findings presented in Section 4, contextualizing them within the national educational landscape and existing research, while addressing the generalizability and limitations of the study.

5.1. Key results concerning teachers' competences

5.1.1. Teachers' competence in digital teaching, AI, ESD and OER

Digital teaching competence (D1–D22)

Across the six DigCompEdu areas, respondents show the highest self-perceived competence in professional engagement and digital resources: 90% use digital channels to communicate with colleagues and learners always or often (p. 18), and 80% regularly find and select digital resources, with 70% creating their own materials (p. 19). By contrast, assessment emerges as the weakest area: 37% of respondents never or rarely use digital assessment tools, and 28% never or rarely use digital technologies to provide feedback (p. 20). A comparable gap appears in Facilitating Learners' Digital Competence: while 69% teach learners to use digital technology safely and responsibly, only 36% set tasks that require learners to communicate and collaborate digitally (p. 21). This pattern — strong in resource use and communication, weaker in assessment and learner-centred digital practices — is consistent with expectations for a sample recruited primarily through digital education networks, where basic digital fluency can be assumed.

These findings are corroborated by TALIS 2024, which provides representative data for the Austrian teacher population at the lower secondary level. In the TALIS sample, digital tools are most frequently used for content presentation or as a replacement for printed materials, while tools for targeted feedback to learners or for the individualisation of learning pathways are used regularly by fewer than one third of teachers (Koschmieder & Unterköfler-Klatzer, 2025, p. 138). Furthermore, 31% of Austrian teachers report feeling unprepared for the use of digital resources in instruction — an improvement from 52% in 2018 — but still indicating persistent competence gaps (Koschmieder & Unterköfler-Klatzer, 2025, p. 139). Notably, TALIS shows that teachers who received training in digital media — whether during initial teacher education or through continuing professional development — not only use digital resources more frequently but also deploy them in a more methodologically diverse manner, particularly in the areas of individualisation and feedback (Koschmieder & Unterköfler-Klatzer, 2025, p. 140). This underscores the relevance of targeted professionalisation precisely at the intersection of digital tool use and pedagogical diagnostics.

AI competence (A1–A24)

A clear gap exists between AI knowledge and AI application. In the TALIS dimension AI Knowledge, 80–81% feel very or completely confident creating content with AI or explaining what AI is (p. 22). Similarly, Human-Centred Education shows high confidence (67–78%), suggesting broad awareness of AI's societal implications (p. 25). However, confidence drops sharply in the AI Assessment dimension: 44% do not feel or only slightly feel confident using AI tools to grade assignments, and 29–43% lack confidence in AI-related assessment design (p. 23). AI Pedagogy occupies a middle position, with approximately half to two-thirds of respondents feeling confident (p. 23). This suggests that while many respondents understand what AI is and can discuss its implications, translating this knowledge into pedagogical and evaluative practice — particularly assessment — remains a significant challenge. Notably, AI Professional Engagement reveals that only about half feel confident sharing AI experiences with colleagues or helping them design AI-based activities (p. 25), which limits peer-to-peer diffusion of AI competences within schools.

TALIS 2024 provides a representative benchmark for these findings. In the Austrian TALIS sample, 39% of teachers report using generative AI in their work, while 61% do not (Koschmieder & Unterköfler-Klatzer, 2025, p. 143). Although this places Austria above the EU average of 32%, the usage rate remains considerably lower than that of university graduates in the general population (approximately 50%; Koschmieder & Unterköfler-Klatzer, 2025, p. 143). A pronounced age effect is observed in both studies: teachers who use AI are on average younger ($M = 40$ years) than non-users ($M = 44.4$ years; Koschmieder & Unterköfler-Klatzer, 2025, p. 143).

Regarding areas of application, TALIS confirms the DigiSET pattern of a knowledge–practice gap: AI is primarily used for lesson planning and topic summarisation (each >60% of AI users), while fewer than 10% of teachers use AI for grading or performance assessment — a figure substantially below the EU average of approximately 25% (Koschmieder & Unterköfler-Klatzer, 2025, p. 145). This pattern corresponds with the DigiSET finding that only about 30% of respondents feel competent in the area of AI-based assessment.

As the principal reason for non-use of AI, approximately two thirds of teachers cite a lack of knowledge and skills (Koschmieder & Unterköfler-Klatzer, 2025, p. 146). It is important to note that this TALIS item operationalises the barrier as a self-identified deficiency in knowledge and skills, which differs conceptually from DigiSET's self-perceived competence measurement. Both findings nonetheless point into substantial need for professional development in AI-related competences among Austrian teachers, though the exact nature of the deficit requires careful interpretation given the differing measurement approaches.

TALIS 2024 further demonstrates that teachers with higher self-efficacy in the use of digital tools and a positive attitude towards them also deploy these tools more frequently. A regression analysis shows that self-efficacy ($b = 0.37$) and a positive basic attitude ($b = 0.18$) together explain 29% of the variance in digital resource use (Koschmieder & Unterköfler-Klatzer, 2025, p. 142). This underscores that professionalisation in AI and digitalisation must not only impart knowledge but also strengthen self-efficacy and attitudes.

ESD competence (S1–S13)

Respondents display markedly higher agreement on Values and Responsibility items than on Pedagogical Practice items. 92% (strongly) agree that they promote values such as responsibility, equity and respect (p. 27), and 87% encourage learners to critically reflect on sustainability issues (p. 30). However, when it comes to practical implementation, agreement rates drop: More than half of the participants (55%) use participatory, learner-centred approaches when addressing sustainability, and almost half of them (48%) (strongly) agree that they use digital technologies when engaging learners with real-world sustainability challenges — with 27% actively disagreeing (p. 26). This indicates that teachers are broadly aligned with ESD values but struggle to translate them into concrete, digitally supported pedagogical practice.

OER competence (O1–O5)

OER competence presents a mixed picture: 50% report prior experience with OER and 56–57% perceive themselves as having the necessary intellectual property rights knowledge and ICT skills to adopt OER (p. 28).

The notably high proportion of respondents reporting familiarity with OER is likely attributable, at least in part, to the broader OER landscape in Austria. Austria is, to date, the only country that has established a formal OER certification system for both higher education institutions and individuals (Schön et al., 2026, p. 8), reflecting a sustained national commitment to OER awareness and adoption. This contextual factor may have contributed to an elevated baseline of OER literacy among survey participants. Furthermore, the recruitment of students from TU Graz is of relevance in this regard, as these students had access to a dedicated university course on OER topics (see TU Graz OER report: Ebner et al., 2026). Their participation in the survey may therefore have disproportionately inflated the share of respondents indicating prior familiarity with OER.

Nevertheless, a substantial minority of 20–36% (strongly) disagree across all OER items. This suggests that roughly one third of respondents — even within this digitally inclined sample — lack the foundational knowledge and confidence to engage with OER. The gap is most pronounced in the active adoption of OER for teaching (only 48% agree), indicating that possessing intellectual property rights knowledge does not automatically translate into practical OER use.

Cross-domain observations

Two intersections are particularly noteworthy. First, assessment emerges as a persistent weak point across both digital teaching and AI competence: respondents who use digital tools confidently for resources and communication still hesitate to use them for evaluation and grading. Second, a gap exists between ESD values and the digital implementation of ESD: while 82% integrate sustainability topics into their teaching (p. 26), only 48% use digital technologies in teaching sustainability. This reinforces a finding from the DigiSET desk research, which identified that digital education and ESD operate largely as separate domains in Austria (Schön et al., 2026, pp. 9–10). The survey results suggest that this separation is also reflected at the level of individual teacher practice.

It must be emphasised that these competence profiles could be inflated by the sample composition: 46% of respondents teach mathematics and 45% computer science/digital literacy (p. 14), subjects closely associated with digital and AI topics.

Reported competence levels — particularly in AI and digital teaching — should therefore, be considered upper-bound estimates rather than representative averages for the Austrian teacher population. While direct comparisons are limited by differing constructs, the TALIS 2024 data offer contextual insight: whereas the DigiSET sample shows 80% confidence in AI knowledge; TALIS indicates that only 39% of the representative Austrian teacher population use generative AI (Koschmieder & Unterköfler-Klatzer, 2025, p. 143). These measures capture distinct dimensions — self-perceived knowledge versus actual usage behaviour — yet the observed gap may suggest that self-reported competence does not necessarily translate into practical application.

The fact that even within the DigiSET sample — with its curricular proximity to digital and AI topics — AI assessment competence is low gains additional urgency when viewed against the TALIS findings: if fewer than 10% of teachers in the representative population use AI for grading purposes (p. 145), it can reasonably be assumed that AI competence in the general teacher population is lower still than in the DigiSET sample. The DigiSET values should therefore, as noted above, be interpreted as upper-bound estimates.

5.1.2. Teachers' competence concerning the four DigiSET topics

The analysis of the four specific DigiSET thematic areas — adaptive AI use, gender bias in AI, inclusive practices, and systems thinking — reveals a differentiated picture of self-perceived competence among the survey respondents. While awareness-related items yield high values, significant gaps emerge in practical application and pedagogical implementation, particularly where digital technologies intersect with complex ethical or inclusive requirements. It should be noted that these findings are based on a self-selected sample and should not be generalised to the entire Austrian teacher population without caution (see Section 5.3).

Adaptive AI use (AD1, AD2)

A notable finding is the discrepancy between theoretical knowledge and practical competence in personalised learning. Almost half of the (48%) of respondents feel “very” or “completely” confident using AI tools to personalise learning for individual students, and the same proportion (48%) reports knowing how to use AI for differentiated instruction based on student needs (p. 29). Conversely, 33% indicate that they are not or only slightly confident in using AI tools for this purpose. This uncertainty aligns directly with the general findings on AI pedagogy (Section 4.2.2), where approximately half of respondents feel confident selecting and integrating AI tools into classroom activities. This suggests that understanding what AI is (knowledge) does not automatically translate into the ability to leverage it for adaptive learning pathways (pedagogy). The desk research report highlights that adaptive testing and fully data-driven assessment systems are not yet widely implemented in Austria, and that practical training gaps persist (Schön et al., 2026, p. 21). The survey confirms that this absence of practical experience contributes to low self-efficacy even among digitally inclined respondents. It should also be acknowledged that the items AD1 and AD2 used a confidence scale despite being

phrased as behavioural/knowledge statements, which may have influenced response patterns (Keser Aschenberger et al., 2026, Section 2.8).

Gender bias in AI (GD1, GD2)

The gender bias items reveal an informative pattern: while 74% of respondents report feeling aware of gender bias in AI-generated content, this figure drops to 49% when asked whether they know how to address gender stereotypes when using AI in teaching (p. 29). Approximately one fifth (21%) feel not or only slightly confident in this regard. This points to a gap between critical awareness and actionable pedagogy. The desk research report notes that while Austria possesses a robust legal and policy framework for gender equality, the specific integration of a gender perspective into AI-focused teacher training remains fragmented and non-systematic (Schön et al., 2026, p. 20). The survey results mirror this: respondents recognise the problem but often lack concrete strategies for addressing it in classroom practice. As with the adaptive AI items, GD1 and GD2 employed a confidence scale for behavioural/knowledge statements, which should be considered when interpreting these results (Keser Aschenberger et al., 2026, Section 2.8).

Inclusive practices for students with learning disabilities (I1, I2)

The findings on inclusive practices warrant particular attention. While 49% of respondents use digital tools to support students with learning difficulties always or often, and 34% report adapting digital learning materials often or always, a substantial 43% indicate that they never or rarely adapt digital learning materials for students with special educational needs (p. 30). This stands in contrast to the strong institutional anchoring of inclusive education described in the desk research report, which highlights policy recognition, teacher education curricula with explicit inclusion modules, and concrete digital-inclusion projects as strengths of the Austrian system (Schön et al., 2026, pp. 22–23). However, the desk research also identifies uneven implementation and the need for more systematic digital-inclusion competence among teachers as key challenges (p. 23). The survey data suggest that while many respondents recognise the necessity of inclusive practices, a considerable proportion lacks the confidence or practical capacity to adapt digital materials effectively for learners with special educational needs. This may partly reflect a terminology issue, as the survey items refer to “learning disabilities” while the Austrian policy and teacher education context predominantly uses the broader concept of “special educational needs” (in German “sonderpädagogischer Förderbedarf”, SPF); the two terms may not be fully synonymous in respondents' understanding.

Systems thinking for sustainability (S1–S3)

In contrast to the other three thematic areas, systems thinking yields the highest self-perceived competence values among the respondents. A large majority of 87% (strongly) agree that they encourage learners to critically reflect on sustainability-related issues, 69% (strongly) agree that they help learners understand the interconnections between environmental, social, and economic aspects of sustainability, and 65% (strongly) agree that they support learners in analysing complex sustainability problems from multiple perspectives (p. 30). These high agreement rates are consistent with Austria's longstanding tradition of Education for Sustainable Development (ESD), supported by networks such as ÖKOLOG and explicit competence frameworks (Schön et al., 2026, p. 6). It is important to note, however, that these items were framed within the ESD section of the questionnaire

and assessed using an agreement scale rather than a confidence scale, which may have contributed to the higher values observed. Furthermore, as discussed in Section 4.3.2, agreement rates drop considerably when it comes to the practical, digitally supported implementation of ESD: only 48% (strongly) agree that they use digital technologies when engaging learners with real-world sustainability challenges, and 27% actively disagree (p. 26). Systems thinking as an attitudinal and content competence is thus well established among respondents, but its digital operationalisation remains a challenge.

Overall assessment and intervention needs

Across the four DigiSET topics, a consistent pattern emerges among respondents: they tend to demonstrate higher awareness and agreement than practical, tool-mediated competence. Systems thinking for sustainability represents the strongest area, likely benefiting from Austria's mature ESD infrastructure and policy tradition. Gender bias awareness is comparatively high, though translating this awareness into pedagogical action remains underdeveloped. The areas revealing the greatest need for intervention are adaptive AI use and inclusive digital practices, where approximately one third or more of respondents report low confidence or infrequent practice.

However, it is important to situate these findings within the broader national context: the desk research report explicitly states that adaptive testing and fully personalised, data-driven learning systems are not yet widely implemented in Austrian schools (Schön et al., 2026, p. 21). Similarly, while inclusive education is politically and institutionally anchored, the systematic provision of accessible digital tools and adapted materials for students with special educational needs appears uneven (Schön et al., 2026, pp. 22–23). This suggests that the low competence values in adaptive AI use and inclusive digital practices reported by respondents do not solely reflect individual teacher deficits but also point to an absence of suitable tools and infrastructure at the systemic level. Respondents cannot be expected to develop confidence in using AI for adaptive learning or in adapting digital materials for inclusive settings if the respective technologies and resources are not reliably available in their schools.

This dual gap — in both respondent competence and tool availability — has direct implications for the DigiSET Teacher Academy. Training modules should not only build pedagogical and technical competences but also introduce and familiarise respondents with concrete, accessible tools for adaptive AI use and digital material adaptation. As the desk research report concludes, the primary challenge is not the absence of individual competences but the lack of an integrated approach that positions digital transformation as a lever for sustainability, inclusion, and personalised learning (Schön et al., 2026, p. 28). The survey results confirm this assessment and underscore that practical, tool-oriented training — combined with attention to systemic infrastructure — should be a priority for DigiSET's intervention design in Austria.

5.1.3. Teachers' learning needs and interest

Following the competence assessments in Section 5.1.2, this subsection presents respondents' concrete learning needs and interests. The analysis draws on open-ended questions (Q1–Q3), structured needs items (P1), and barrier indicators (P2)

from the DigiSET survey. To validate these findings, they are compared again with the representative TALIS 2024 results for Austria (Koschmieder & Unterköfler-Klatzer, 2025) wherever comparable data points are available.

Open-ended responses (Q1–Q3): Challenges and desired competences

Across the open-ended items (n=47 for Q1, n=38 for Q2, n=20 for Q3), respondents predominantly named time constraints and rapidly advancing technological change as their principal challenges. Representative statements included: “I simply lack the time to engage intensively with it” and “The rapid speed of progress that digital technologies have reached [...] exceeds my available time almost daily” (p. 31). Infrastructure limitations were also cited by some respondents (“Poor technical equipment in the school, no stable functioning Wi-Fi”), while a few questioned the pedagogical necessity of certain digital tools. These qualitative insights are consistent with the TALIS 2024 finding that 54% of Austrian teachers report feeling “fairly or very stressed” by their work — a figure significantly above the EU average of 43% (Koschmieder & Unterköfler-Klatzer, 2025, p. 43).

Regarding desired competences (Q2), respondents emphasised structural support (e.g., “More time to try out new apps”). Prominent themes included practical guidance on AI-assisted assessment (“Methods for assessing group work, because it is difficult to determine which part is personal, which part is from AI”), differentiated AI tools (“Helpful would be especially deepened media-pedagogical and technical competences [...] equally important are knowledge about how sustainability can be conveyed in a practical and cross-curricular manner”), and curated resources over abstract theory (“Concrete teaching materials that meaningfully connect digital education with sustainability”). These requests correlate with the competence gaps identified in Sections 5.1.1 and 5.1.2, particularly regarding AI assessment (low confidence) and adaptive AI use (33% low self-efficacy). The frequent framing of time and infrastructure as prerequisites rather than competence gaps suggests that respondents perceive systemic barriers as primary constraints. TALIS 2024 corroborates this pattern, with 69% of AHS teachers and 54% of MS teachers citing time constraints as the foremost barrier to participation in professional development activities (Koschmieder & Unterköfler-Klatzer, 2025, p. 64).

Priority training areas (P1)

Structured items on training needs (p. 34) revealed three dominant priorities:

- Inclusive digital teaching (48%)
- Using adaptive learning tools (39%)
- Using AI in teaching (38%)

These priorities align closely with the competence gaps identified in Sections 5.1.1 and 5.1.2:

- The high demand for inclusive digital teaching mirrors the low confidence in adapting digital materials for special educational needs (Section 5.1.2; 43% rarely or never adapt materials).
- Interest in adaptive learning tools correlates with the low self-efficacy in personalised AI applications (Section 5.1.2; 33% low confidence).
- AI in teaching remains a broad need, consistent with the knowledge–practice gap in AI pedagogy (Section 4.2.2 vs. 4.2.3).

Notably, however, a discrepancy emerges when these figures are compared with TALIS 2024. In the TALIS survey, competences for the use of artificial intelligence was identified as the single most frequently expressed training need among Austrian teachers, with 62% indicating moderate or high need (Koschmieder & Unterköfler-Klatzer, 2025, p. 62) — substantially higher than the 38% reported in the DigiSET sample.

This divergence may partly reflect self-selection effects within the DigiSET sample. Unlike TALIS 2024, which employed a representative stratified sampling procedure (Koschmieder & Unterköfler-Klatzer, 2025, pp. 20–22), the DigiSET survey drew on a self-selected respondent group that had voluntarily engaged with a project focused on sustainable digital literacy. It is therefore plausible that these respondents already possess comparatively higher awareness of AI-related topics and consequently perceive less acute AI training needs than the broader teacher population captured by TALIS. Conversely, their heightened sensitivity to sustainability and inclusion may explain the elevated priority assigned to inclusive and adaptive pedagogies. By contrast, the convergence on classroom management is striking: Exactly 57% of teachers in both surveys identified this as a moderate or high training need (Koschmieder & Unterköfler-Klatzer, 2025, p. 90), providing robust cross-validation that this need is consistent regardless of sample composition.

Training needs for integrating sustainability (16%) and addressing gender bias in AI (15%) ranked lower, despite high awareness levels in Section 5.1.2. This discrepancy may reflect respondents' prioritisation of immediate pedagogical challenges (e.g., inclusion, assessment) over conceptual awareness.

Barriers (P2)

Barriers to professional development (p. 34) were dominated by:

- Lack of time (73%)
- Lack of available training (40%)
- Lack of suitable resources/materials (38%)
- Lack of institutional support (30%)
- Lack of infrastructure (20%)

The overwhelming prominence of time constraints aligns with the qualitative data in Q1 and underscores the challenge of implementing training within existing workload structures. The high ranking of lack of available training (40%) contrasts with the Country Report's description of Austria's robust CPD infrastructure (Schön et al., 2026a, pp. 17–18), suggesting a mismatch between existing offerings and respondents' perceived needs. Specifically, respondents sought practical, tool-oriented training (Q2) rather than theoretical frameworks — a gap noted in the Country Report's analysis of fragmented ESD and AI ethics provision (p. 19).

Interestingly, a tension emerges regarding infrastructure. While one of every five DigiSET respondents cited lack of infrastructure as a barrier (20%), school leaders in TALIS 2024 reported that over 90% of schools possess good digital infrastructure (Koschmieder & Unterköfler-Klatzer, 2025, p. 137). Qualitative responses from DigiSET participants hint at a more nuanced reality, mentioning issues such as “poor technical equipment in the school, no stable functioning Wi-Fi” or that “not all children have everything with them” during lessons — suggesting that while school-

level infrastructure may be adequate, device availability at the classroom or student level can remain inconsistent. This discrepancy suggests that the actual barrier lies less in hardware availability and more in the *didactic integration* of existing tools — a distinction that has significant implications for training design. Furthermore, TALIS data reveal that teachers with prior training in digital media use digital tools not only more frequently but also in more methodologically diverse ways, particularly for individualised instruction and feedback (Koschmieder & Unterköfler-Klatzer, 2025, p. 141), underscoring the cascading effect of professional development on classroom practice. While no explicit comments on regulatory ambiguities emerged in the DigiSET survey responses, the evolving and yet incomprehensive policy framework for AI in education may nonetheless contribute to hesitancy among teachers regarding which tools are permissible for classroom use.

Synthesis and implications for DigiSET training design

The alignment between training needs (P1) and competence gaps (Sections 5.1.1–5.1.2) confirms that respondents recognise their own development priorities, particularly in inclusive digital practices and adaptive AI use. However, the dominance of structural barriers (time, infrastructure) complicates capacity-building efforts. As the DigiSET country report notes, Austria possesses strong foundational frameworks but struggles with integrated implementation (Schön et al., 2026a, p. 28). This dual challenge — individual competences and systemic enablers — must inform the DigiSET Teacher Academy's design. Three concrete implications emerge:

- **Modular, time-efficient formats:** Training should prioritise short, asynchronous modules, and just-in-time resources to accommodate time-constrained respondents. The TALIS finding that scheduling conflicts with the timetable constitute a major barrier for 64% of AHS and 50% of MS teachers (Koschmieder & Unterköfler-Klatzer, 2025, p. 64) reinforces the necessity of formats that minimise disruption to classroom duties.
- **Tool-centred pedagogy:** Modules must integrate concrete examples of inclusive material adaptation and AI-driven differentiation, addressing the “how-to” gap identified in Sections 5.1.2 and Q2. The TALIS evidence that trained teachers employ digital tools significantly more diversely — including for individualised learning pathways and differentiated feedback (Koschmieder & Unterköfler-Klatzer, 2025, p. 141) — provides a strong empirical rationale for this approach.
- **Systemic advocacy components:** Training should equip respondents to articulate infrastructure, and resource needs to school leadership, bridging the individual–institutional divide noted in Q1/Q3. The TALIS finding that 56% of school leaders report a shortage of time resources for pedagogical leadership (Koschmieder & Unterköfler-Klatzer, 2025, p. 118) indicates that systemic constraints affect both teachers and leaders, making joint advocacy essential.

Importantly, the lower priority assigned to sustainability integration (P1: 16%) despite high systems thinking competence (Section 5.1.2) suggests that respondents view sustainability as a cross-cutting goal rather than a standalone competence. This supports the Country Report recommendation to position digital sustainability as an interdisciplinary lever rather than a discrete topic (Schön et al., 2026a, p. 28).

5.2. Contextualisation within the national framework

The survey findings from Austria must be interpreted against the backdrop of a rapidly evolving national policy landscape that has undergone significant structural changes since the initial desk research phase. While the country possesses robust foundational frameworks, the survey data reveals a distinct misalignment between high-level policy ambitions and the practical readiness of teachers, particularly regarding the integration of digital tools for sustainability and inclusive practices.

5.2.1. Alignment with national policies and frameworks

The competence profile of the respondents largely mirrors the structural priorities set by the digi.kompP framework, which was updated in April 2026 to explicitly include AI and ESD criteria. The high self-perceived competence in “professional engagement” and “digital resources” (Section 4.1) aligns with Austria's long-standing emphasis on digital infrastructure and the eEducation Austria ecosystem. The fact that 80% of respondents regularly find and select digital resources reflects the success of national initiatives like the eduthek and the widespread availability of hardware through the “Digital Learning” device initiative.

However, a critical divergence emerges regarding the newest legislative developments. In June 2026, the National Council passed a major curriculum reform introducing the compulsory subjects “Informatik und Künstliche Intelligenz” (Computer Science and AI) and “Medien und Demokratie” starting in the 2027/28 school year. While this policy ambition aims to secure AI literacy at the student level, the survey results suggest that the teacher workforce is not yet fully prepared to deliver this new curriculum. This conclusion is underscored by the fact that 45% of the respondents are computer science or digital literacy teachers and an additional 29% are still students — meaning a substantial portion of the sample already possesses subject-specific proximity to digital topics. Despite this disciplinary advantage, 44% of respondents lack confidence in using AI for assessment, and only 38% feel confident in AI pedagogy more broadly. If even those already engaged in computer science and digital education struggle with adequate AI assessment practices, the readiness gap can be expected to be considerably larger among the general teaching population. Importantly, this lack of confidence is compounded by systemic constraints: as the desk research report notes, adaptive testing and fully data-driven assessment systems are not yet widely implemented in Austria, and suitable tools for AI-based assessment remain scarce. Respondents cannot be expected to develop competence in using AI for assessment if the respective technologies and resources are not reliably available in their schools. Viewed from a different angle, this policy leap may be interpreted less as lagging behind capacity and more as a deliberate strategic impulse to accelerate educational modernization — though such acceleration inherently carries the risk of overburdening teachers without sufficient concurrent support. The policy thus pushes for AI integration faster than both the professional development infrastructure can upskill the existing teaching corps and the technological ecosystem can provide appropriate tools — and the DigiSET data, with its digitally inclined sample, likely represent an upper bound rather than a representative average of teacher readiness.

Furthermore, the survey highlights a disconnect between the digi.kompP framework's theoretical inclusion of sustainability and actual practice. While the

framework explicitly links technology and society (Criterion B.2), only 48% of respondents reported using digital technologies to engage learners with real-world sustainability challenges. This suggests that while the policy framework exists, the operational “how-to” for integrating digital tools into ESD remains underdeveloped in daily practice, confirming the desk research finding that digital education and ESD often operate in parallel silos.

5.2.2. Reflection on the desktop research findings

The survey results validate several key observations from the WP2 Country Report (Desk Research). Specifically, the finding that Austria lacks a unified “sustainable digital literacy” concept is reflected in the data: teachers feel strong on sustainability values (92% agreement) but weak on the digital execution of these values. The desk research noted that OER creation lacks systematic hands-on training; the survey confirms this, with 20–36% of respondents disagreeing on their OER competences despite the digi.kompP framework referencing it since 2021.

Moreover, the desk research identified that while inclusive education is strongly anchored in policy, implementation is uneven. The survey data supports this, showing that while 49% use digital tools for inclusion, a substantial 43% rarely or never adapt digital materials for students with special educational needs. This indicates that policy mandates have not yet translated into routine pedagogical practice for a significant portion of the workforce.

5.2.3. Surprising findings and explanations

One surprising finding is the relatively low priority assigned to “integrating sustainability into teaching” (16% training need) despite the high national focus on ESD (ÖKOLOG network) and its explicit inclusion in digi.kompP. This may be explained by the fact that many respondents view sustainability as a cross-curricular topic rather than a standalone competence needing specific training, or they may feel that their current competence in values (92% agreement) is sufficient, masking a lack of practical digital pedagogical strategies for ESD.

Another unexpected insight is the strong resistance to the uncritical adoption of digital tools expressed in the open-ended comments, with some teachers questioning the necessity of increased screen time. This contrasts with the generally optimistic tone of national policy documents. It suggests that a segment of the teaching workforce is experiencing “digital fatigue” or scepticism, driven by the rapid pace of change (especially regarding AI) and the perception that digitalization often increases preparation time rather than reducing it—a sentiment that policy narratives emphasizing efficiency often fail to address.

In summary, while Austria's national framework provides a sophisticated theoretical basis for digitally sustainable teaching, the survey reveals that the practical translation of these frameworks into classroom reality is hindered by time constraints, fragmented training formats, and a lag in specific competences regarding AI assessment and inclusive digital adaptation. The upcoming curriculum reforms will likely exacerbate these tensions unless targeted, practical support is provided to bridge the gap between policy ambition and teacher readiness.

5.3. Limitations

The findings of the Austrian DigiSET teacher survey should be interpreted in light of several methodological limitations affecting the generalizability. The study used non-probability convenience and snowball sampling, with recruitment conducted largely through digital education networks and open dissemination channels. This approach produced a self-selected sample likely to have greater interest in digital technologies and professional development than the wider Austrian teaching population. The findings should therefore be regarded as indicative of trends among digitally engaged educators rather than representative of all Austrian teachers.

The sample differs notably from the national teacher population. As discussed in Section 3.6, computer science and digital literacy teachers accounted for 45% of respondents, although they constitute only a small proportion of teachers nationally. Furthermore, 29% of the sample were students, whereas the national teaching workforce consists predominantly of practising teachers. Certain groups were also insufficiently represented or lacked formal recruitment pathways, including private-school teachers, teachers from traditional subject areas such as humanities and languages, educators connected to ESD-focused networks, and those working in rural or socioeconomically disadvantaged regions. Recruitment through PH Steiermark may also have contributed to a regional concentration in Styria.

Following data cleaning, 106 responses were included in the analysis. This represents less than 0.1% of Austria's approximately 128,385 teachers (Statistik Austria, Teaching Staff Statistics 2025; see Table 3, p. 15). Because the survey was distributed through both open channels and targeted emails, the total number of individuals who received the invitation cannot be determined, and a response rate cannot be calculated. The modest sample size is adequate for descriptive analysis but does not support robust subgroup comparisons. Any observed differences between groups should therefore be treated as exploratory.

The sampling and recruitment strategy may have led to an overestimation of self-reported competences in digital teaching, AI, and OER. Conversely, structural and infrastructural barriers may be underestimated because teachers with lower levels of digital engagement were less likely to participate. Caution is therefore required when extrapolating the results to school types, subject areas, regions, or teacher groups that were underrepresented in the survey.

The study also relied entirely on self-assessment. Respondents' perceived competence may not correspond to their demonstrated ability, and social desirability may have influenced responses concerning socially valued areas such as sustainability, inclusion, and ethical practice. As documented in the central methodology report (Keser Aschenberger et al., 2026, Section 2.8), several instrument-design issues may also have affected response patterns. Items concerning adaptive AI use and gender bias in AI were phrased as knowledge or behavioural statements but assessed using confidence scales. In addition, the ESD section used an agreement scale, whereas confidence scales were employed in other competence areas, limiting direct comparisons across domains. Terminological inconsistencies, such as alternating between "learners" and "students," may also have resulted in variations in interpretation.

Finally, the survey was administered in German and subsequently translated into English for consortium-wide reporting. Some nuances and culturally specific terminology—such as the distinction between *sonderpädagogischer Förderbedarf* and “learning disabilities”—may have been altered or lost during translation.

Despite these limitations, the sample remains valuable for the purposes of the DigiSET project. It includes both practising teachers (54%) and pre-service teachers (29%), encompasses diverse age groups and levels of professional experience, and provides qualitative insights through open-ended responses that are not captured by standardized instruments such as TALIS. Comparison with representative TALIS 2024 data (Koschmieder & Unterköfler-Klatzer, 2025) also provides an important contextual reference. Nevertheless, future research using probability-based sampling, larger samples, and objective competence assessments would be needed to validate and generalize the findings to the wider Austrian teacher population.

6. Implications

By grounding the project design in these survey findings, DigiSET seeks to move beyond theoretical frameworks and establish a practical, evidence-based pathway for sustainable digital transformation in higher and vocational education. Building upon the teachers' survey results in Austria, the following implications should influence the DigiSET project.

6.1. Implication for DigiSET

Based on the Austrian survey findings, the following implications should inform the design of the DigiSET Teacher Academy and the Framework of Learning Outcomes.

6.1.1. Priority competence areas

The survey identifies three priority competence areas for the DigiSET Teacher Academy. First, the findings reveal a gap between respondents' general confidence in explaining AI and their ability to apply it in teaching and assessment. Respondents reported uncertainty about AI-supported grading and the pedagogical use of AI (p. 22ff). This pattern is consistent with TALIS 2024, which found that AI is rarely used for grading by Austrian teachers (Koschmieder & Unterköfler-Klatzer, 2025, p. 145). The Academy should therefore prioritise training that translates general AI knowledge into pedagogically sound assessment approaches and practical classroom applications.

Second, inclusive digital teaching and the adaptive use of AI emerge as closely related training priorities. Many respondents reported that they rarely or never adapt digital materials for students with special educational needs and expressed limited confidence in using AI for adaptive learning (see Fig. 23 and 25, p. 29ff). Inclusive digital teaching was also the most frequently selected training need (p. 34). Training modules should consequently combine practical guidance on digital and AI tools with pedagogical approaches to differentiation, accessibility, and inclusion.

Third, the findings indicate a need to strengthen the practical implementation of digital education for sustainable development (ESD). Although respondents generally endorsed ESD values and encouraged learners to reflect critically on sustainability, the use of digital technologies to address real-world sustainability challenges was less widespread (Figures 19, 20, and 26, p. 26ff). The DigiSET Teacher Academy should address this gap by presenting digital sustainability not as an isolated topic but as an interdisciplinary approach that connects digital practices with authentic sustainability challenges, as recommended by the desk research (Schön et al., 2026, p. 28).

6.1.2. Training design addressing the identified barriers

The survey findings also point to three priorities for the design of the training programme. First, the modules should be modular, flexible, and time efficient. Lack of time was the most frequently reported barrier, and respondents repeatedly emphasised that limited time restricted their ability to explore new applications, develop materials, or participate in training (p. 34). TALIS 2024 similarly identifies scheduling conflicts as a major barrier to professional development among Austrian

teachers (Koschmieder & Unterköfler-Klatzer, 2025, p. 64). Short, asynchronous, and just-in-time learning units could therefore facilitate participation while minimising disruption to teachers' classroom responsibilities.

Second, training should prioritise practical application over abstract theory. In the open-ended responses, teachers requested concrete, pre-tested resources that meaningfully connect digital education with sustainability. This finding suggests that existing professional-development opportunities may not always correspond to teachers' perceived needs. Modules should therefore include practical tool demonstrations, curated and grade-appropriate resources, and adaptable templates for activities such as AI-supported differentiation, inclusive material design, and sustainability education.

Third, the academy should incorporate community-based and peer-learning structures. Respondents expressed only moderate confidence in sharing their experiences with AI or supporting colleagues in designing AI-based learning activities (p. 25). Collegial mentoring, case discussions, collaborative resource development, and structured exchanges of classroom experiences could strengthen peer learning and support the wider diffusion of AI and digital competences within schools.

6.1.3. Specific learning outcomes for Austria

Based on these priorities, the framework of learning outcomes for the Austrian context should enable participants to:

- design and implement AI-supported assessment approaches that are pedagogically sound, ethically informed, and feasible within existing school infrastructures;
- select, evaluate, and adapt digital tools and AI applications for differentiated instruction and inclusive learning environments, including materials for students with special educational needs;
- integrate digital technologies into ESD through real-world sustainability activities that apply systems thinking and participatory, learner-centred methods;
- identify and critically address gender bias in AI-generated content and translate this awareness into appropriate pedagogical strategies;
- apply media-pedagogical, technical, legal, and ethical knowledge when selecting and using digital technologies and AI;
- use AI appropriately as a learning support tool while helping learners engage with it critically, responsibly, and independently; and
- respond to systemic barriers by communicating resource and support needs to school leadership and contributing to school-level digitalisation strategies.

Overall, the findings reveal a recurring gap between respondents' general awareness, knowledge, and commitment to relevant values and their confidence in practical, tool-mediated implementation. By addressing this gap, the DigiSET Teacher Academy can help Austrian teachers prepare for forthcoming curriculum reforms while ensuring that digital transformation supports sustainability, inclusion, and pedagogical quality.

6.2. Additional insights

The survey findings point to two areas requiring immediate attention at the national policy level.

First, the introduction of the compulsory subjects *Informatik und Künstliche Intelligenz* and *Medien und Demokratie* in the 2027/28 school year should be supported by binding and adequately funded professional development programmes, rather than competence frameworks alone. Respondents reported limited confidence in AI-supported assessment, while lack of time emerged as the principal barrier to participation in professional development (Fig. 15 and 28, p. 23). This finding is consistent with TALIS 2024, which identifies timetable conflicts as a major obstacle to training participation among Austrian teachers (Koschmieder & Unterköfler-Klatzer, 2025, p. 64). Policymakers should therefore provide dedicated time for professional development within teachers' contractual working hours. Without such structural support, the planned curriculum reforms may place demands on teachers for which they have not been adequately prepared. This concern is particularly relevant because notable gaps in AI-related assessment and pedagogy were identified even in the digitally oriented DigiSET sample, which included a substantial proportion of computer science and digital literacy teachers.

Second, national assessments of digital infrastructure should be complemented by systematic evaluations of its availability and reliability at the classroom level. Although TALIS 2024 school leaders generally assessed their schools' digital infrastructure positively, DigiSET participants described unstable Wi-Fi, insufficient access to student devices, and malfunctioning equipment in their open-ended responses (Section 4.6.1). These findings reflect different levels of analysis and are not necessarily contradictory: infrastructure that appears adequate at the school level may not always be accessible or reliable in everyday classroom practice. Policymakers should therefore establish school-level technical support structures and regularly assess the functionality and availability of digital resources in classrooms. Teachers cannot be expected to develop and apply digital teaching competences effectively when the necessary technological environment is unreliable, regardless of their individual competence or motivation.

The findings also highlight two priorities for future research.

First, because all competence measures in the present study were based on self-assessment, future studies should include objective measures such as scenario-based tasks, classroom observations, or evaluations of teaching materials and other professional artefacts. This would help determine the extent to which teachers' perceived competence corresponds to their demonstrated ability. Such validation is especially important in areas including AI-supported assessment and the adaptation of materials for inclusive education, where gaps between perceived and demonstrated competence may affect educational quality.

Second, the forthcoming introduction of compulsory AI and media-and-democracy subjects provides an important opportunity for longitudinal research. Monitoring changes in teacher readiness, professional development, infrastructure, classroom implementation, and student outcomes would generate evidence to inform ongoing policy adjustments. Comparisons among schools receiving different forms and levels

of preparatory training, technical support, and resource allocation could identify the mechanisms that most effectively strengthen teacher readiness. The resulting evidence would be relevant not only to Austria but also to other countries within the DigiSET consortium and beyond that are pursuing similar reforms in digital education and AI integration.

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