# Secondary School Teachers' Attitudes Toward AI Integration in Teaching

## Survey across four European countries


2024

Editor: Maria Hartyányi, iTStudy Hungary Educational and Research Centre

Contributors: Zivile Satiene (Lithuania), Pierfranco Ravotto (Italy), Daniel Escuer (Spain)

## Introduction

iTStudy conducted a survey in 2024 with secondary school teachers from four European countries—Hungary, Italy, Spain, and Lithuania. The survey aimed to provide an initial insight into teachers' attitudes toward the emergence of AI, their understanding of its potential impact on their lives and teaching, and their perceptions of both its opportunities and risks.

An online questionnaire was implemented on the survey platform of the European Union (https://ec.europa.eu/eusurvey/) in five languages [1], and the data were collected from 17 to 23 July 2024. The statistical analysis was based on the sample with the 271 responses, from which 2 responses didn't come from the target countries, so in the analysis we used 269 samples.

Link to the questionnaire!

Our research assumptions were as follows:

- Teachers experience significant uncertainty and confusion about AI, often holding misconceptions about the skills required for its effective use.
- They recognize AI's increasing influence across various economic sectors and acknowledge the need for vocational education – along with their own teaching practices – to adapt accordingly.
- While many teachers feel unprepared to integrate AI into their classrooms, they are aware that many students are already engaging with this technology.
- Teachers are open to incorporating AI into their teaching but require professional development and upskilling to use it effectively alongside modern pedagogical approaches. However, the adoption of innovative teaching and assessment methods remains below expectations, with traditional frontal teaching still being predominant.

Although the survey was not fully representative, the sample size allows important and statistically validated conclusions to be drawn, which are in line with the key findings of relevant national and international studies.

[1] It is still available (see: https://ec.europa.eu/eusurvey/runner/92693465-6f7f-546d-8de5-d59bed3e8be3 )

## Summary and conclusions

The survey provided strong evidence supporting the assumptions outlined in your research.

**Uncertainty and confusion about AI**
The result highlights that the educators are uncertain about AI and have misconceptions about the required competencies. A significant portion of respondents indicated that they lacked confidence in their ability to use AI effectively, demonstrating confusion regarding its application.

**Recognition of AI's role in economic actors**
Teachers acknowledged the increasing relevance of AI in various economic sectors and the importance of adapting education to meet these changes. However, despite recognizing the need for integration, they expressed that they were not fully prepared to meet these challenges.

**Acknowledgment of student engagement with AI**
Many teachers admitted that students are already using AI in their work. This awareness was coupled with concerns about being left behind, as educators recognized the gap between student familiarity with AI and their own preparedness.

**Challenges in Teaching**
The survey identified several major challenges faced by teachers:

- **Adapting to innovative teaching methods**
  66% of respondents found the transition from traditional to innovative teaching methods, such as project-based and flipped classroom models, to be challenging.
- **Student behaviour and learning needs**
  Changes in student behaviour and learning preferences, particularly among younger generations, were reported as significant or high challenges by over 70% of respondents.
- **Digital literacy and AI integration**
  Nearly 55% found the rapid increase in students' digital literacy a challenge. Furthermore, there was widespread concern (64%) regarding the integration of AI and advanced digital tools in teaching.

**Digital skills and AI usage**
Most respondents rated their digital skills as intermediate (36.9%) or advanced (40.59%), with only a small percentage (5.17%) reporting basic skills. Despite this, only 19 out of 269 teachers reported regularly using AI tools like ChatGPT in their daily teaching practices. Teachers were open to experimenting with AI but lacked confidence in their ability to apply AI effectively in areas such as curriculum development, performance assessment, and teaching material preparation.

**Teaching methods**
Frontal teaching remains the most used method, with 53.5% of respondents using it frequently. More modern approaches like game-based learning and flipped classroom techniques were less popular, indicating that vocational education is still transitioning to innovative pedagogical strategies. Inquiry-based learning and experiential learning were also utilized less frequently, reflecting potential areas for development.

**Performance assessment methods**
Summative (final) assessment remains the most frequently used method across all countries, with over 39% of teachers using it regularly. Formative assessment, including peer reviews and portfolio evaluations, was less common, with many teachers unfamiliar with these methods. This suggests a potential knowledge gap regarding contemporary assessment practices.

**AI in daily teaching tasks**
When asked about the use of AI for daily teaching tasks, such as preparing lesson plans or assessing student work, most teachers expressed interest but only a small fraction were actively experimenting with AI. The reluctance to fully adopt AI tools was due to concerns about digital competence, with many teachers mistakenly believing that advanced ICT knowledge is required to use AI effectively.

**Openness to AI and the need for professional development**
Teachers expressed openness to using AI but identified a need for professional support and upskilling. The survey also confirmed that traditional teaching methods like frontal teaching remain dominant, with the use of innovative teaching and assessment methods being lower than expected.

**Attitudes toward AI and technology**
Teachers expressed both optimism and caution regarding AI's role in education. While 43% agreed that AI is essential for the labor market, over 50% believed that most teachers are not yet prepared to integrate AI into their classrooms. Furthermore, teachers stressed that effective AI integration requires managerial support and teacher collaboration.

The survey highlights several critical challenges in education, particularly around the integration of technology and the adoption of innovative pedagogical methods. While teachers possess strong academic backgrounds and substantial teaching experience, there is a clear need for professional development in digital literacy and AI literacy. Many educators remain reliant on traditional teaching approaches and are hesitant to adopt active learning methods and formative assessment. Enhancing teachers' confidence in using AI tools could significantly improve the effectiveness of vocational education, helping educators better prepare students for the demands of the modern workforce.

## Statistical analysis

**Demographic Profile of Respondents**

The survey sampled 269 vocational education teachers from four European countries: Hungary (29.89%), Italy (35.06%), Lithuania (12.18%), and Spain (21.77%). The majority of respondents were women (56.83%), with notable gender differences between countries—Spain had more male teachers (61.02%), while Lithuania had a significantly higher proportion of female teachers (69.7%.

**Educational Background**

*A large portion of the teachers surveyed (68.27%) hold a master's degree (MSc),* indicating that vocational education professionals are well-qualified academically. However, the rate of teachers holding vocational qualifications (9.96%) was much lower, suggesting a gap between theoretical knowledge and hands-on practical experience.

**Teaching Experience**

The teaching experience of respondents varied significantly across countries. A large portion of the respondents (39.11%) have been in the profession for 11-24 years, while 34.32% have more than 25 years of experience. Notably, Lithuania had a high proportion of younger teachers (39.39% with 0-5 years of experience), whereas Italy had the highest percentage of teachers with over 25 years of experience (42.11%).

**Institution type and subjects taught**

The majority of respondents (51.66%) teach at vocational high schools, with Spain and Italy reporting the highest numbers in this category. In terms of subjects taught, most educators cover both theoretical and practical vocational subjects. Additionally, a significant proportion teach general subjects (40.15%), followed by vocational theoretical (11.2%) and vocational practical subjects (14.1%). This diversity in teaching roles highlights the varied skill sets among vocational educators.

## Statistical analysis

1. **Country**

| | | Answers | Ratio |
|---|---|---|---|
| United Kingdom | | 1 | 0.37% |
| Lithuania | | 33 | 12.18% |
| Hungary | | 81 | 29.89% |
| Italy | | 95 | 35.06% |
| Spain | | 59 | 21.77% |
| Other, please specify! | | 2 | 0.74% |
| No Answer | | 0 | 0% |
| | | 271 | |

Even if it wasn't a representative survey, we received a significant number of responses from the 4 partner countries, which is a good starting point for analysing the current situation. From the 271 response we used 269 coming from the partner countries.

**2. Gender**

| | | Total | Hungary | Italy | Lithuania | Spain |
|---|---|---|---|---|---|---|
| Female | | 56.83% | 60.49% | 61.05% | 69.7% | 38.98% |
| Male | | 42.44% | 39.51% | 36.84% | 30.3% | 61.02% |
| I do not want to respond | | 0.74% | 0% | 2.11% | 0% | 0% |

| | | | | | | |
|---|---|---|---|---|---|---|
| No Answer | | 0% | 0% | 0% | 0% | 0% |

Most of the respondents are women, though the rate of men in vocational education is higher than in public education. This is common in the teaching profession in all countries. However, the figure of Spain shows even higher proportion of men opposite with other countries[2].

**3. Highest level of education**

| | | Total | Hungary | | Italy | Lithuania | Spain |
|---|---|---|---|---|---|---|---|
| Vocational qualification | | 9.96% | 2.47% | | 16.84% | 6.06% | 11.86% |
| College (BsC) | | 12.55% | 20.99% | | 8.42% | 18.18% | 5.08% |
| University (MsC) | | 68.27% | 71.6% | | 57.89% | 75.76% | 74.58% |
| Doctorate (PhD) | | 9.23% | 4.94% | | 16.84% | 0% | 8.47% |
| No Answer | | 0% | 0% | | 0% | 0% | 0% |

High majority of the respondents have MSc degree: this figure stands a little bit lower in Italy, while the rate of vocational qualification is much higher. We could draw the conclusion from this result, that the vast majority of VET teachers have higher theoretical knowledge than practical.

**4. Teaching experience**

| | | Total | Hungary | Italy | Lithuania | Spain |
|---|---|---|---|---|---|---|
| 0-5 years | | 14.02% | 7.41% | 6.32% | 39.39% | 22.03% |
| 6-10 years | | 12.55% | 12.35% | 13.68% | 6.06% | 15.25% |
| 11-24 years | | 39.11% | 46.91% | 37.89% | 18.18% | 38.98% |
| More than 25 years | | 34.32% | 33.33% | 42.11% | 36.36% | 23.73% |
| No Answer | | 0% | 0% | 0% | 0% | 0% |

While the figures reveal notable differences across the countries - such as the high percentage of teachers with more than 25 years of experience in Italy (42%), compared to a significantly lower proportion in Spain (23.73%) - the overall trend aligns with international statistics. The data indicate a general shift towards older age groups in the teaching profession, as reflected in the high proportion of teachers with over 25 years of experience in the full sample.[3]
This fact must be considered when thinking about digital transformation of vocational education. The relatively higher rate of young teachers in Lithuania and Spain will give added value to the project aims by generating collaboration among the different age groups of teachers.

**5. What type of institution do you teach in? (you may indicate more)**

| | | Total | Hungary | Italy | Lithuania | Spain |
|---|---|---|---|---|---|---|
| Vocational school | | 26.57% | 22.22% | 9.47% | 69.7% | 37.29% |
| Vocational gymnasium | | 14.02% | 18.52% | 17.89% | 18.18% | 0% |
| Vocational high school | | 51.66% | 79.01% | 30.53% | 27.27% | 59.32% |

[2] In 2021, men made up approximately 27% of the teaching workforce in primary, lower secondary, and upper secondary education across the EU. The share of male teachers was notably higher in certain countries like Denmark and Luxembourg, where the proportions of male teachers were 38% and 36%, respectively. This ratio indicates that male participation in teaching, particularly in public education, remains relatively low across. (Eurostat: https://ec.europa.eu/eurostat/web/products-eurostat-news/w/edn-20231005-1)

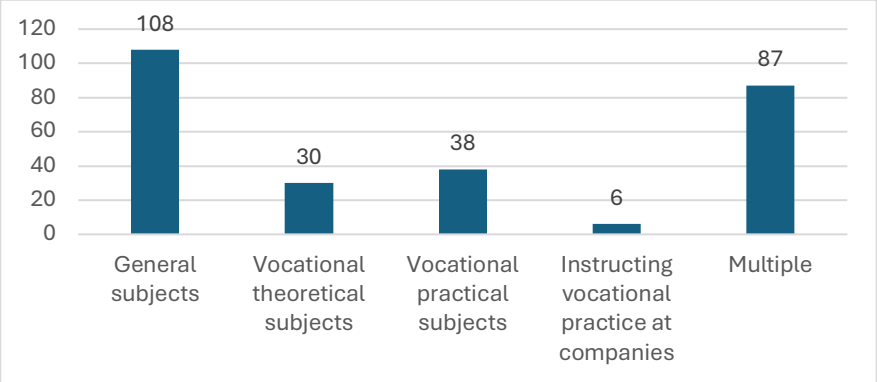
[3] On average across OECD countries, 43% of teachers in vocational education and training (VET) at the upper secondary level are aged 50 or over. This reflects an ageing VET teacher workforce, as well as the fact that some VET teachers gain industry experience before joining the teaching profession. (OECD (2023), Education at a Glance 2023: OECD Indicators, OECD Publishing, Paris, https://doi.org/10.1787/e13bef63-en )

| | | | | | | |
|---|---|---|---|---|---|---|
| Higher education | | 16.61% | 6.17% | 30.53% | 0% | 16.95% |
| Other, please enter! | | 14.76% | 4.94% | 34.74% | 0% | 5.08% |
| No Answer | | 0% | 0% | 0% | 0% | 0% |

This result demonstrates that the target group (vocational school teachers) was reached by the questionnaire.

Other:
Spain: Continuing Education for Employed Workers, Vocational Training Centre, Vocational Training
Italy: Higher Technical Institute (2), Lower Secondary School, Primary (2) - Lower Secondary School (5), Comprehensive Primary School (9), ITS and CFP, Primary School (9), I taught in a scientific high school, Provincial Centre for Adult Education, teacher for projects L.107/2015USR Campania

**6. What subjects do you teach? (you may indicate more)**




| | | |
|---|---|---|
| General subjects | 108 | 40,1% |
| Vocational theoretical subjects | 30 | 11,2% |
| Vocational practical subjects | 38 | 14,1% |
| Instructing vocational practice at companies | 6 | 2,2% |
| Multiple | 87 | 32,3% |
| Total | 269 | 100% |

The figures show, that most of the respondents teach both theoretical and vocational subjects. The rate of general subject teachers is relatively high, while the result shows lower number of trainers from companies. However, the list below demonstrates a wide variety of subjects what is positive regarding the reliability of the conclusions of the survey.

**7. Please, specify the subjects you are teaching:**
Languages:
- English (Angol nyelv, English language): 11 occurrences
- Italian/Italiano: 12 occurrences
- German/Német: 3 occurrences
- French/Francese: 2 occurrences
- Spanish/Spagnolo: 1 occurrence
- Latin/Latino: 3 occurrences
- Hungarian (Magyar nyelv és irodalom): 7 occurrences

Sciences:
- Mathematics (Matematika, Math): 19 occurrences
- Physics (Fizika): 6 occurrences

- Chemistry (Kémia, Chimica): 5 occurrences
- Biology (Biológia, Biotechnológia, Scienze naturali): 10 occurrences
- Informatics/IT (Informatika, Digitális kultúra): 21 occurrences
- Technology (Tecnologia, Műszaki ismeret, Sostegnoinformatica): 8 occurrences
- Humanities and Social Sciences:
- History (Történelem, Storia, Állampolgári ismeretek): 10 occurrences
- Psychology (Pszichológia): 3 occurrences
- Pedagogy (Neveléselmélet, Pedagógia): 5 occurrences
- Economics (Gazdasági ismeretek, Accounting and finance): 7 occurrences
- Marketing: 5 occurrences

Vocational and Technical Subjects:

- Engineering/Electronics (Elektrotechnika, Electrical engineering): 12 occurrences
- Automation/Robotics: 4 occurrences
- Mechanical Technology (Műszaki rajz, Mechanika): 5 occurrences
- Catering/Tourism (Vendéglátás): 3 occurrences
- Health Sciences (Elsősegélynyújtás, Nursing): 3 occurrences

Art and Design:

- Art (Művészet, Design): 4 occurrences
- Music (Zene, Musica): 2 occurrences
- Additional Topics:
- Physical Education (Testnevelés): 4 occurrences
- Law (Jogi ismeretek, Legal studies): 2 occurrences

**8. The EQF/NQF level you teach (more than one may be indicated)!**

| | | Total | Hungary | Italy | Lithuania | Spain |
|---|---|---|---|---|---|---|
| EQF 3 | | 10.7% | 6.17% | 15.79% | 15.15% | 6.78% |
| EQF 4 | | 28.04% | 17.28% | 33.68% | 42.42% | 27.12% |
| EQF 5 | | 21.4% | 19.75% | 18.95% | 0% | 40.68% |
| EQF 6 | | 4.43% | 3.7% | 5.26% | 3.03% | 5.08% |
| EQF higher than 6 | | 4.8% | 6.17% | 5.26% | 3.03% | 3.39% |
| I dont know the EQF, can't decide | | 52.77% | 70.37% | 42.11% | 42.42% | 49.15% |
| No Answer | | 0% | 0% | 0% | 0% | 0% |

Vast majority of the respondents teach at the EQF level 4 and 5. **However, the statistics of the full sample are particularly surprising: a significant number of respondents have no knowledge of the European Qualifications Framework (EQF), which has been in effect since 2008.** This lack of awareness is particularly pronounced in Hungary, despite the fact that the Hungarian National Qualifications Framework was introduced in 2013. It means, that a very high rate of VET teachers is not aware of the learning outcome oriented curriculum design.

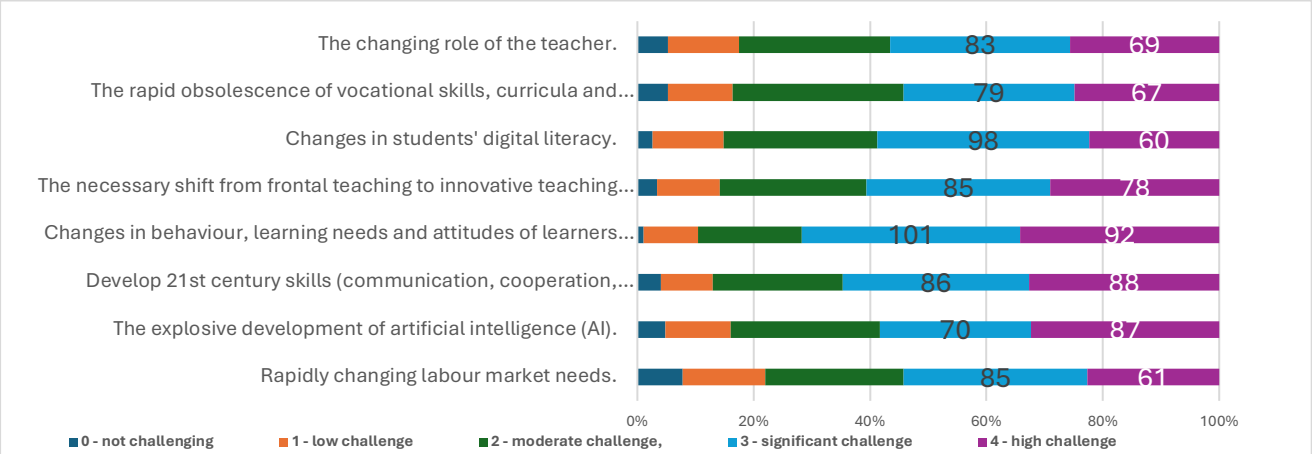
This finding clearly highlights the critical need to make better use of the European Educational Frameworks, particularly in the professional development of vocational teachers. Encouraging their understanding and use of these frameworks could greatly enhance their ability to align with European standards and contribute more effectively to their educational systems.

**9. How challenging are the followings in your field of teaching? Please indicate from 0 to 4 (0 - not challenging, 1 - low challenge, 2 - moderate challenge, 3 - significant challenge, 4 - high challenge)**

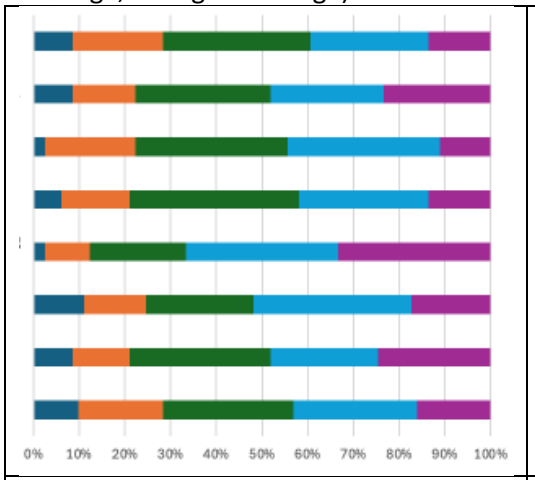
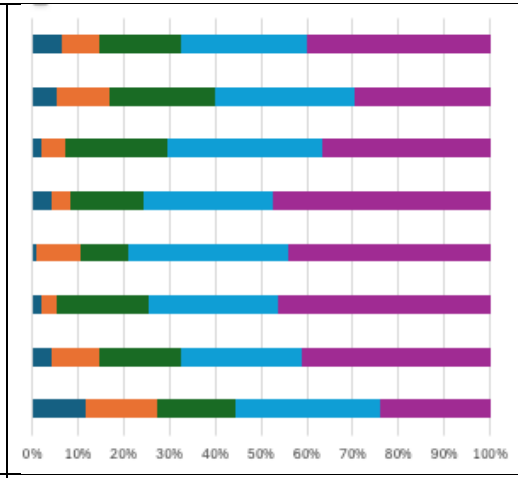
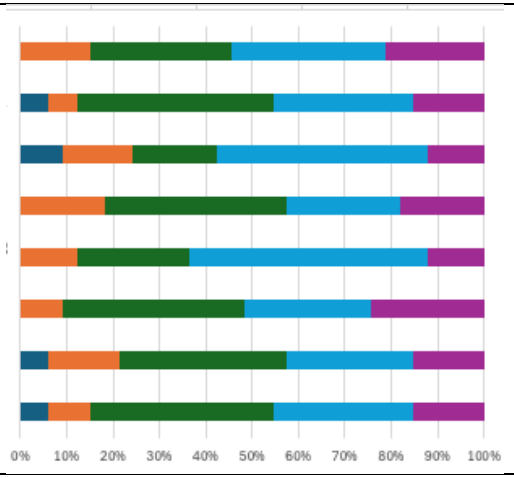
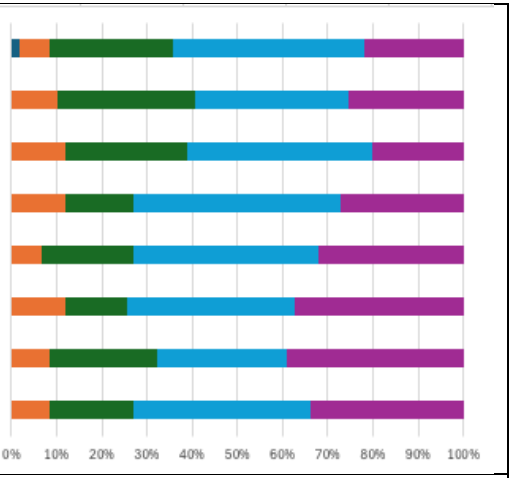
| Total | 0 - not challenging | 1 - low challenge | 2 - moderate challenge | 3 - significant challenge | 4 - high challenge |
|---|---|---|---|---|---|
| 1.The changing role of the teacher. | 5,9% | 12,7% | 27,5% | 32,6% | 21,2% |
| 2.The rapid obsolescence of vocational skills, curricula and textbooks. | 5,9% | 11,0% | 30,9% | 30,9% | 21,2% |
| 3.Changes in students' digital literacy. | 3,0% | 13,6% | 27,5% | 36,0% | 19,9% |
| 4.The necessary shift from frontal teaching to innovative teaching and assessment methods. | 3,4% | 11,4% | 28,0% | 32,2% | 25,0% |
| 5.Changes in behaviour, learning needs and attitudes of learners of the young generation. | 0,8% | 9,3% | 19,9% | 38,6% | 31,4% |
| 6.Develop 21st century skills (communication, cooperation, critical thinking, etc.) using modern methods and digital tools. | 4,7% | 9,7% | 22,9% | 32,2% | 30,5% |
| 7.The explosive development of Artificial Intelligence (AI). | 4,2% | 11,0% | 26,3% | 27,1% | 31,4% |
| 8.Rapidly changing labour market needs. | 8,5% | 13,1% | 24,6% | 31,8% | 22,0% |

Almost without exception, all areas are assessed as "significant or high challenges, especially if we take the "moderate" one as neutral: a relatively higher rate (around 50%) of the respondents think that all the items mean significant or high challenges for the teaching process. This figure is close or over 60% at the items:

- The necessary shift from frontal teaching to innovative teaching and assessment methods.
- Changes in behaviour, learning needs and attitudes of learners of the young generation.
- Develop 21st century skills (communication, cooperation, critical thinking, etc.) using modern methods and digital tools
- The explosive development of artificial intelligence (AI).



9. Diagrams: How challenging are the followings in your field of teaching? Please indicate from 0 to 4 (0 - not challenging, 1 - low challenge, 2 - moderate challenge, 3 - significant challenge, 4 - high challenge).

| | | | |
|---|---|---|---|
|  |  |  |  |
| Hungary | Italy | Lithuania | Spain |

As regards the origin of the respondents, the differences aren't too significant among them, however Italian and Spanish teachers (the two countries presumably being at higher level of digital transformation comparing to the other two countries!) put the level (significant+high) of the 4 selected challenges (4,5,6,7) much higher than the Hungarian and Lithuanian teachers.

- 4. The necessary shift from frontal teaching to innovative teaching and assessment methods. (IT: high: 47.37%, SP: significant: 45.76%)
- 5. Changes in behaviour, learning needs and attitudes of learners of the young generation. (IT: high: 44,21%, SP: significant: 40.68%)
- 6.Develop 21st century skills (communication, cooperation, critical thinking, etc.) using modern methods and digital tools. (IT: high: 46.32%, SP: high: 37.29%)
- 7.The explosive development of Artificial Intelligence (AI). (IT: high: 41.05%, SP: high: 38.98%)

**These figures indicate that deeper understanding correlates with increased awareness of risks and challenges.**

10. How would you classify your current digital skills?

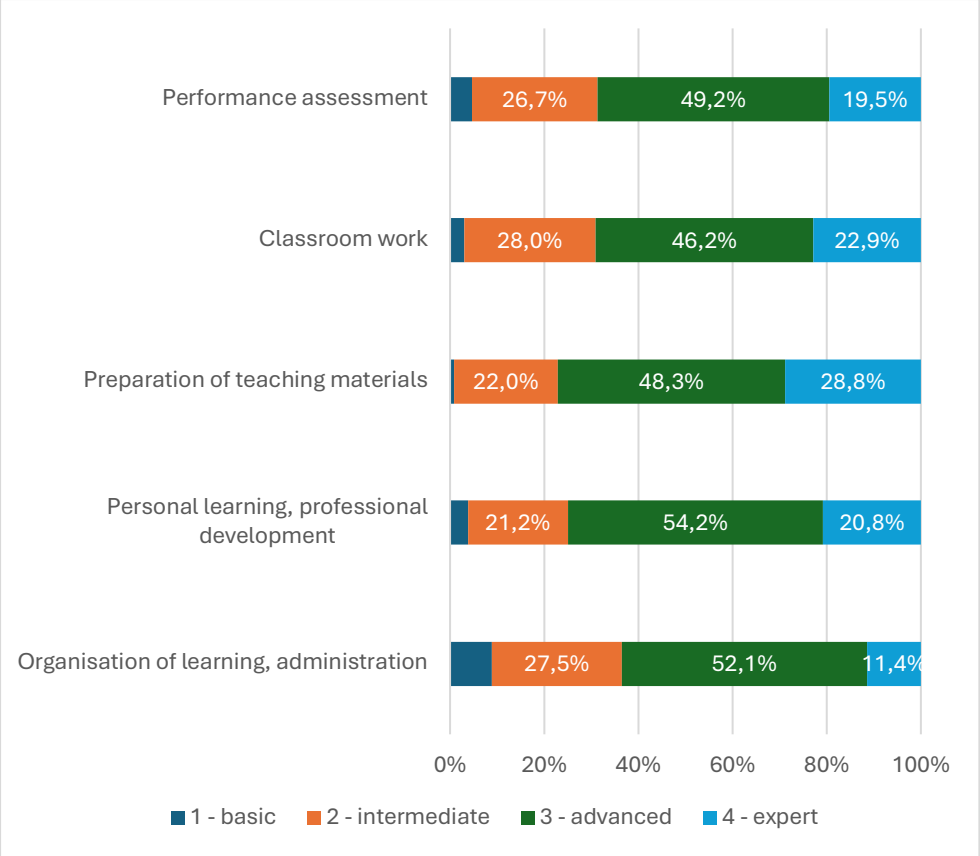
| | | Total | Hungary | Italy | Lithuania | Spain |
|---|---|---|---|---|---|---|
| basic level | | 5.17% | 3.7% | 2.11% | 12.12% | 6.78% |
| intermediate level | | 36.9% | 46.91% | 22.11% | 39.39% | 45.76% |
| advanced level | | 40.59% | 38.27% | 42.11% | 48.48% | 37.29% |
| expert level | | 17.34% | 11.11% | 33.68% | 0% | 10.17% |
| No Answer | | 0% | 0% | 0% | 0% | 0% |

The figures are close to the average distribution: vast majority of the respondents reported an intermediate or advanced level of digital skills, while only a few respondents selected the basic level and expert level. At the same time, we can see significant differences among the 4 countries: in Italy 33% of teachers put themselves to expert level, in Lithuania nobody.

A remarkably low proportion (less than 6%) of the respondents rated their own digital skills at basic level. Compared to a survey ten years ago, there is a very positive change: more than 77% of the respondents are at intermediate or advanced and 16% are at expert level. The changes might be explained by the online education introduced during the COVID-19 pandemic, when teachers had to adopt to it very quickly and this gave them confidence.

11. What level of ICT knowledge do you think teachers need today to apply the potential of AI in the areas listed? 1 - basic, 2 - intermediate, 3 - advanced, 4 – expert.

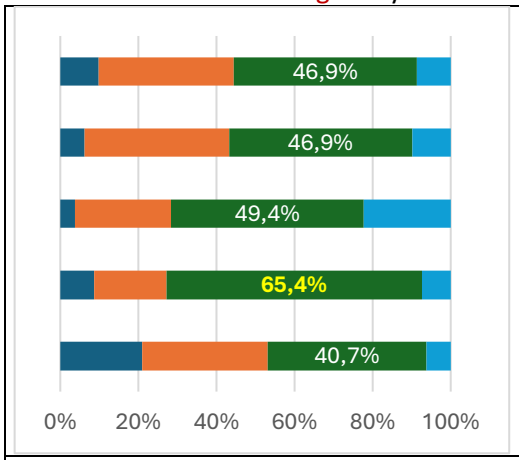
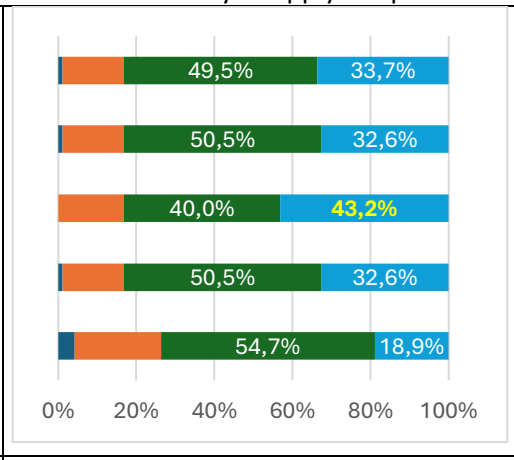
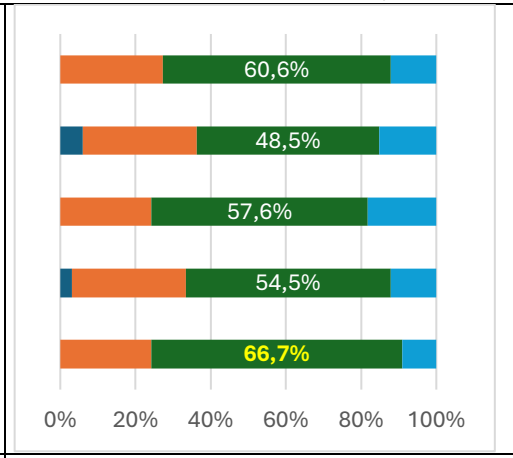
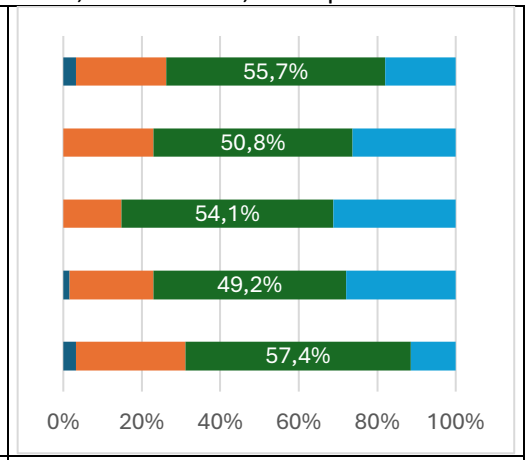
| Total | 1 - basic | 2 - intermediate | 3 - advanced | 4 - expert |
|---|---|---|---|---|
| Performance assessment | 4,7% | 26,7% | 49,2% | 19,5% |
| Classroom work | 3,0% | 28,0% | 46,2% | 22,9% |
| Preparation of teaching materials | 0,8% | 22,0% | 48,3% | 28,8% |
| Personal learning, professional development | 3,8% | 21,2% | 54,2% | 20,8% |
| Organisation of learning, administration | 8,49% | 27,5% | 52,1% | 11,4% |




Most of the respondents assumes that basic level ICT knowledge isn't enough for using the potential of Artificial Intelligence. They believe that at least intermediate or preferably advanced level of IT skills is essential across all five areas to effectively utilize AI solutions. The highest rates are given in "Personal learning and professional development" (54% and 20,8%, respectively), what proves that many teachers are deceived by misconceptions about AI. They aren't aware of that Artificial Intelligence solutions are fundamentally different compared to any other software solutions or digital tools before AI, and it isn't the IT knowledge that is the most important for the conscious and effective use of AI tools.

Another misconception about AI is that 28,8 % of respondents assume that expert level ICT knowledge is needed to be able to develop learning materials with AI.

What level of ICT knowledge do you think teachers need today to apply the potential of AI in the areas listed? 1 - basic, 2 - intermediate, 3 - advanced, 4 – expert.

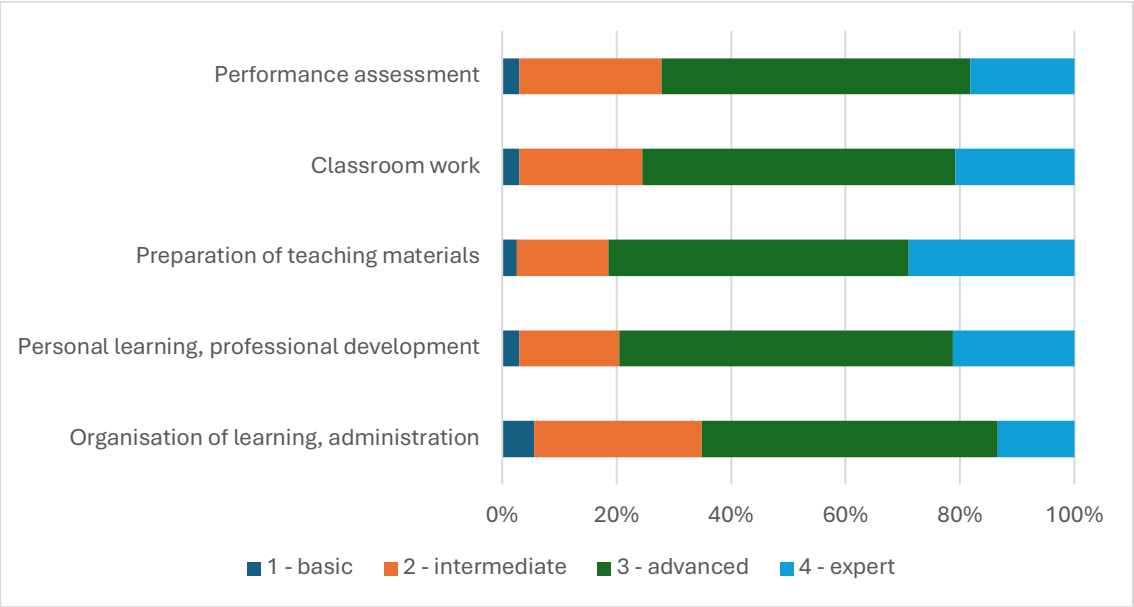
| | | | |
|---|---|---|---|
|  |  |  |  |
| Hungary | Italy | Lithuania | Spain |

The country specific charts show similar distribution except few significantly high/low figures:

- The rate of “advanced level ICT knowledge” in using AI for “Personal learning and professional development” is high in each sample, however the Hungarian figure (65,4%) is remarkably high even among them.
- In the Italian sample the rate of teachers is extremely high (43,2%) who assume that expert level ICT knowledge is needed for creating learning material with AI.
- In the Lithuanian sample the figures of “*advanced level*” are significantly higher than in other countries in all categories but even so, the 66,7% given here is extremely high. More than two third of the Lithuanian respondents assume that using AI for “Organisation of learning and administration” needs advanced level ICT knowledge – what is also a proof of misbeliefs about AI.

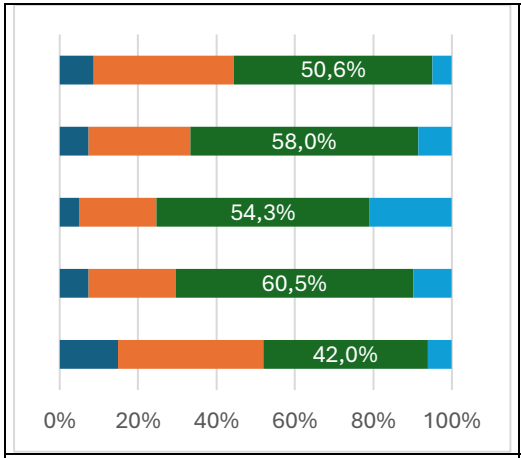
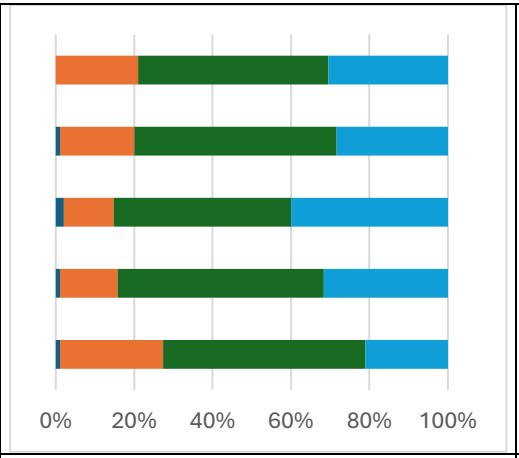
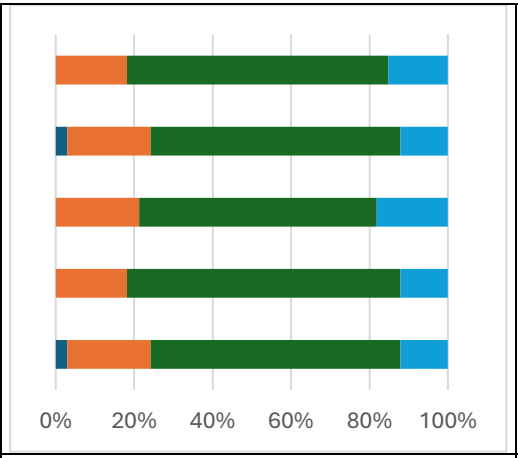
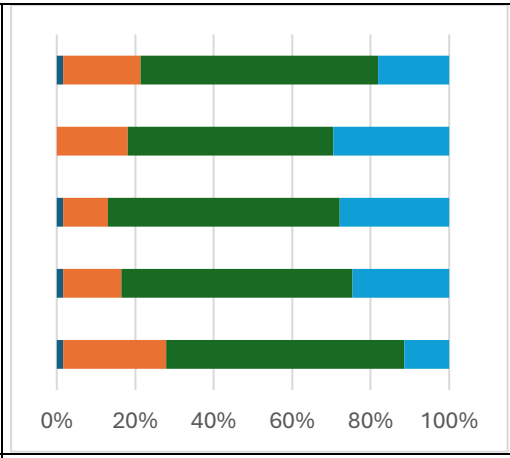
12. What level of digital skills do you think teachers need today to apply the potential of AI in the areas listed? 1 - basic, 2 - intermediate, 3 - advanced, 4 – expert.

| Total | 1 - basic | 2 - intermediate | 3 - advanced | 4 - expert |
|---|---|---|---|---|
| Performance assessment | 3,0% | 25,0% | 54,2% | 17,8% |
| Classroom work | 3,0% | 21,2% | 55,1% | 20,8% |
| Preparation of teaching materials | 2,5% | 15,7% | 55,5% | 26,3% |
| Personal learning, professional development | 3,0% | 18,6% | 58,4% | 20,8% |
| Organisation of learning, administration | 5,9% | 28,8% | 52 % | 12,7% |




The distribution of figures is very similar to the results of the previous question, Q11 that asked about the theoretical background (ICT knowledge), while Q12 enquires about practical digital skills needed for using AI in the same 5 categories.

While AI solutions are supposed to make developing digital learning materials easier, 26,3% of the respondents assume that it requires expert level digital skills. More than 55% believe that at least advanced level digital skills are required while in fact it is critical thinking and high level vocational professional knowledge that are needed to use AI for developing learning materials.
The figures prove that teachers aren't familiar with AI solutions yet. The backlog might be much bigger than our survey indicates, as the questionnaire did not reach teachers at rural schools, in disadvantaged vocational schools, where even project-based education is questionable.

| | | | |
|---|---|---|---|
|  |  |  |  |
| Hungary | Italy | Lithuania | Spain |

Regarding the samples of the 4 countries, the difference in the results of Q11 is striking: the number of teachers who assumed that basic digital skills are enough for using Artificial Intelligence for teaching and learning is close to zero in each country (except for Hungary).

This clearly demonstrates how false the perception is among teachers regarding the nature of AI and what skills are needed to take advantage of the opportunities it offers.

13. List at least 5 digital tools/applications that you use in your lessons on a daily basis.

The list below is in accordance with the results of Q11 and Q12. It justifies that the respondents have a false picture of the skills and competences needed for using AI in their work: only 19 teachers out of the 269 mentioned using an AI solution on a daily basis.

The list gives a very clear insight into the digital tools used by the respondents. From the results we can draw the following conclusions:

- Artificial Intelligence tools aren't used by the respondents.
- COVID 19 was a breakthrough in using communication and collaboration tools like Teams, Zoom, Google workspaces.
- Significant number (60 from 269) of the respondents are familiar with e-learning solutions, online learning environments like Moodle, Google Classroom.
- Coding tools are listed by teachers teaching IT professions.
- The usage of gamification tools is very rare, only Kahoot was mentioned relatively by many (48). The same is true regarding using digital tools for the assessment of students' performance, surprisingly even LearningApps that has an easy-to-use user interface and is available in all European languages received only 7 mentions in this category.
- The most widely used tools (mentioned by about 100 respondents) for content creation are the Office programs (Word, PowerPoint) even today, and the number of teachers who use more advanced tools for creating pictures, videos, animations and e-books (Powtoon, Genially, Photoshop, etc.) is very low.
- Only 44 respondents mentioned any data analysis and project planning tools.
- Only 2 teachers mentioned virtual platforms like Minecraft (offered to promote creativity, problem-solving, and collaboration which is very popular with students).
- YouTube was mentioned only 17 times by the respondents!

More than 30 years after the first personal computers were introduced to education and despite several technological streams (e-learning, multimedia, Web 2.0) a survey involving 269 vocational teachers from four countries reveals that the use of digital tools in education has remained limited. Even today, the majority of digital applications used in classrooms are basic tools like Word, Excel, and PowerPoint, while more advanced solutions, such as tools for creating videos or animations, are utilized by only a small proportion of vocational teachers involved into the survey.

1. Communication and collaboration tools
    - Microsoft Teams (27)
    - Zoom (2)
    - Gmail (16)
    - Canva (52)
    - Google Slides (7)
    - Prezi (2)
    - Padlet (8)
    - Mentimeter (13)
    - Trello (3)
    - Miro (2)
    - Google Workspace, Drive, Google Docs (25)
    - Jamboard (3)

2. Artificial Intelligence (AI) Tools
    - ChatGPT (14)
    - Copilot (2)
    - Gemini AI (2)
    - AI-powered tools for education (1)

3. Assessment and gamification tools
    - Kahoot (48)
    - Quizlet (3)
    - LearningApps (7)
    - Quizizz (4)
    - Wordwall (13)
    - Panquiz (4)
    - Socrative (2)
    - Random Group Generator (1)
    - Playposit (1)

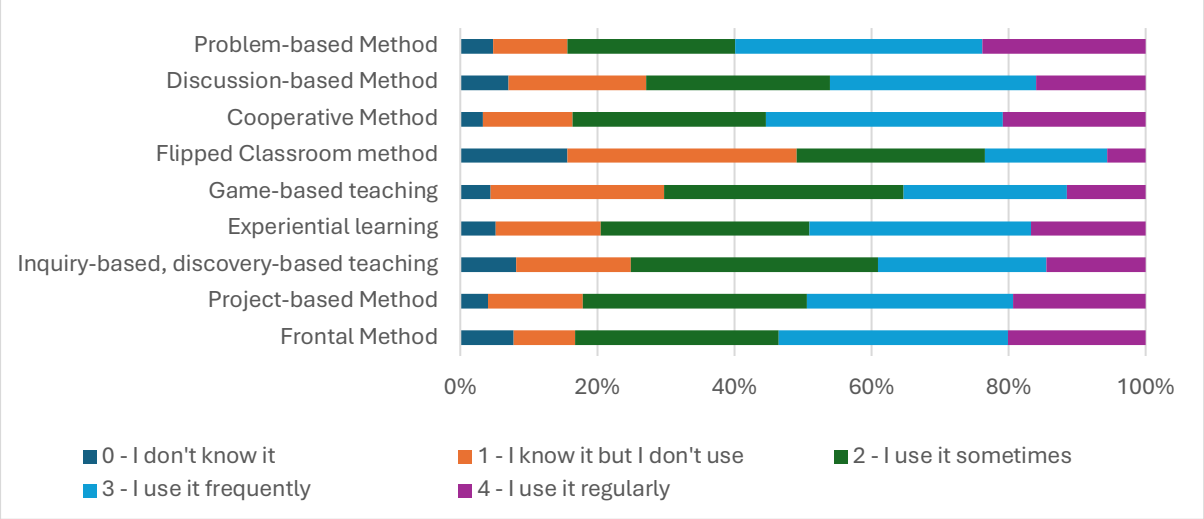
4. Coding and simulation tools
    - Arduino (3)

- AutoCAD (5)
- Solidworks (3)
- TinkerCAD (2)
- C++ / Java Compilers (2)
- Flowgorithm (1)
- MIT App Inventor (1)
- Yenka Technology (1)
- Packet Tracer (2)
- Python (3)
- Scratch (2)
- C# (1)
- Visual Studio Code (1)
- PHPMyAdmin (1)

5. Learning Management Systems (LMS) and Educational Platforms
    - Moodle (32)
    - WeSchool (2)
    - Google Classroom (24)
    - Educamos (3)
    - Zoom (2)
    - Google Workspace (general)
    - Educa (1)
    - DigiPad (2)
    - CMS systems (general)
6. Digital content creation
    - Biteable (1)
    - Powtoon (2)
    - Genially (7)
    - Flipgrid (1)
    - Book Creator (2)
    - Capcut (2)
    - Photoshop (2)
    - Wizer.me (1)
    - Word (42)
    - PowerPoint (31)
    - Office (22)
7. Data analysis and project planning
    - Excel (21)
    - Google Sheets (5)
    - Power BI (1)
    - Office 365 (5)
    - MS Project (2)
    - LibreOffice (3)
    - OneDrive (1)
    - GoogleForms (10)
8. Interactive and virtual platforms
    - Thinglink (2)
    - Minecraft Education Edition (1)
    - Classcraft (1)
9. Multimedia tools
    - YouTube (17)
    - Edpuzzle (3)
    - Video editors (2)
    - WeTransfer (1)
    - Streamable (1)
10. General tools and devices
    - Internet Browsers (Chrome, Firefox) (6)
    - Laptop (31)
    - Smartboards (5)
    - Tablets (4)
    - Projectors (3)
    - Smartphones (24)
    - Smart TVs (2)
    - ClassVR headsets (1)
11. Mathematical and visualization tools
    - GeoGebra (7)
    - Desmos (2)

14. How often do you use the teaching methods enlisted below? 0 - I don't know it, 1 - I know it, but I don't use, 2 - I use it sometimes, 3 - I use it frequently, 4 - I use it regularly.

| | 0 - I don't know it | 1 - I know it, but I don't use | 2 - I use it sometimes | 3 - I use it frequently | 4 - I use it regularly |
|---|---|---|---|---|---|
| Frontal method | 7,8% | 8,9% | 29,7% | 33,5% | 20,1% |
| Project-based method | 4,1% | 13,8% | 32,7% | 30,1% | 19,3% |
| Inquiry-based, discovery-based teaching | 8,2% | 16,7% | 36,1% | 24,5% | 14,5% |
| Experiential learning | 5,2% | 15,2% | 30,5% | 32,3% | 16,7% |
| Game-based teaching | 4,5% | 25,3% | 34,9% | 23,8% | 11,5% |
| Flipped classroom method | 15,6% | 33,5% | 27,5% | 17,8% | 5,6% |
| Cooperative method | 3,3% | 13,0% | 28,3% | 34,6% | 20,8% |
| Discussion-based method | 7,1% | 20,1% | 26,8% | 30,1% | 16,0% |
| Problem-based method | 4,8% | 10,8% | 24,5% | 36,1% | 23,8% |




Highly surprising, as seen in the table above, there are respondents in each category who selected "I don't know it". It indicates that many of them are unfamiliar with essential pedagogical concepts relevant to the 21st century. Moreover, a notable proportion (8%) are unaware of the meaning of even traditional, teacher-centered methods such as the 'frontal method.'

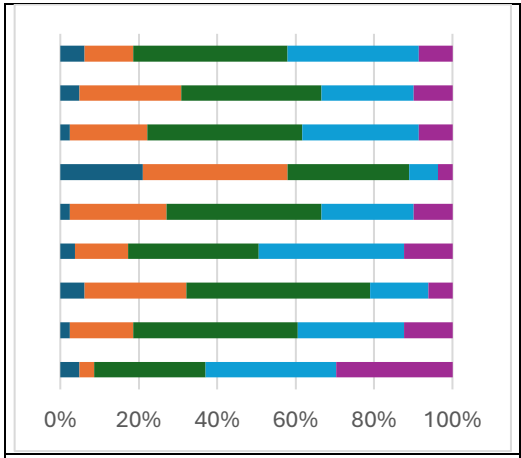
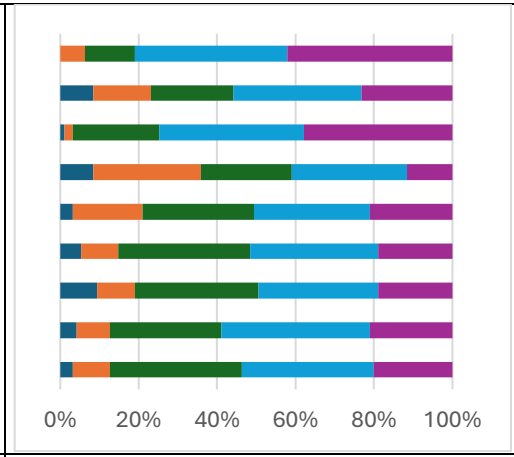
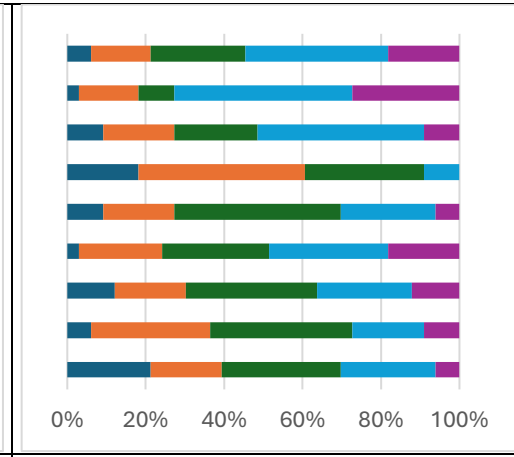
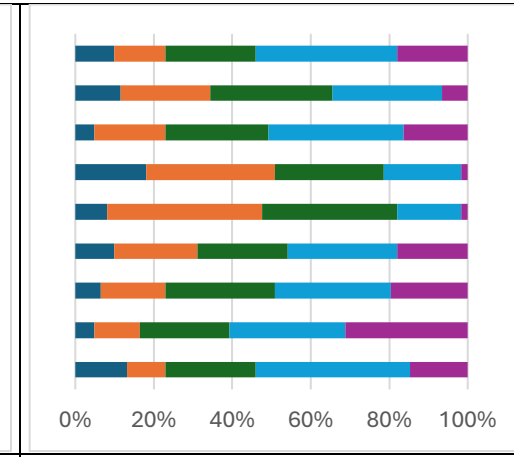
It is in-line with recent research showing low-level pedagogical competences of VET teachers in general. "The pedagogical competence of VET teachers and HE educators is quite limited in many member countries and that initial teacher education for VET teachers is weaker at developing pedagogical skills than for general education teachers."[4].

Flipped Classroom method is not known and not used by the teachers; the rate of frontal teaching method is common and frequently used by the respondents; the rate of teachers using game-based learning is very low as well.

Considering the subjectivity of the respondents, we can assume, that the numbers in the last column "I use it regularly" might be closest to reality.

[4] OECD (2021), Teachers and Leaders in Vocational Education and Training, OECD Reviews of Vocational Education and Training, OECD Publishing, Paris, https://doi.org/10.1787/59d4fbb1-en., Page 150.

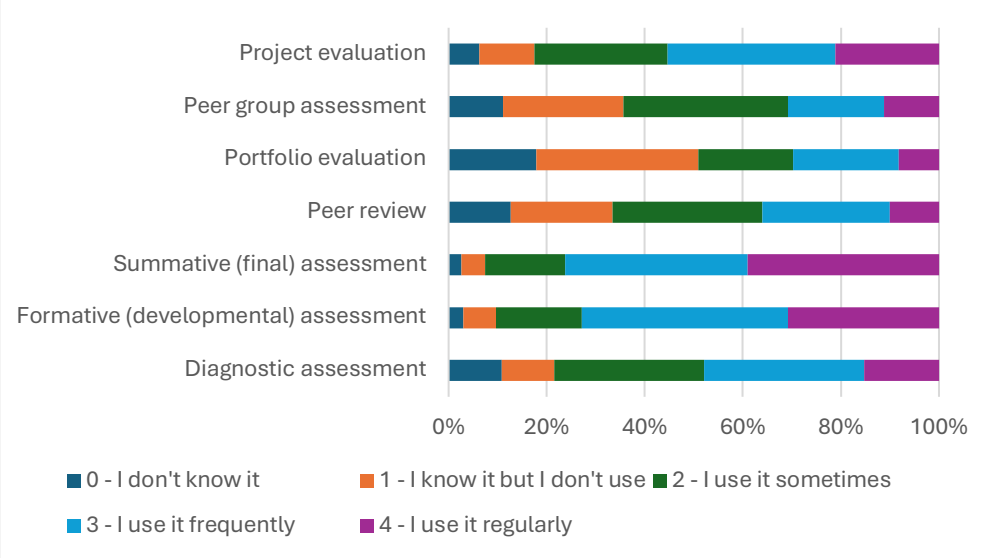
How often do you use the teaching methods enlisted below? 0 - I don't know it, 1 - I know it, but I don't use, 2 - I use it sometimes, 3 - I use it frequently, 4 - I use it regularly.

| | | | |
|---|---|---|---|
|  |  |  |  |
| Hungary | Italy | Lithuania | Spain |
| | | | |

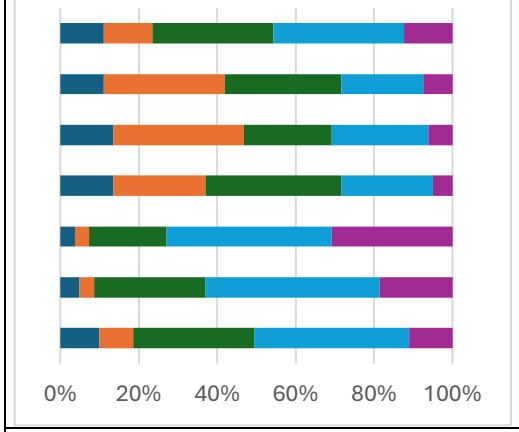
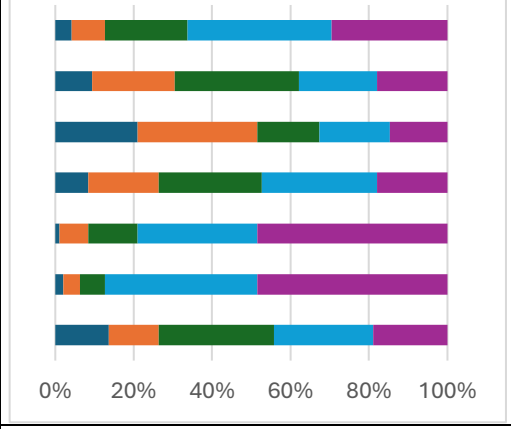
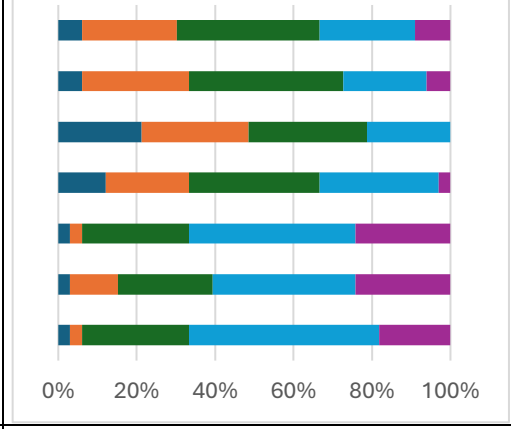
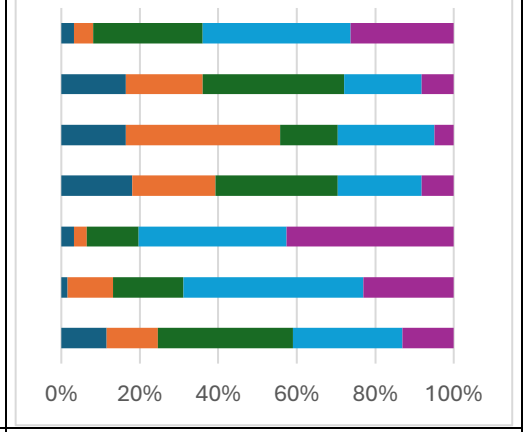
There is some alteration between countries. In Lithuania, the role of discussion-based education is the most important while project-based education takes the lead in Spain. As for the traditional frontal method, only a few Lithuanian teachers (6,1%) claim to use it regularly while almost 30% of the Hungarian respondents admitted using this method in class frequently. However we can't take 21,2 % of the Lithuanian teachers seriously when stating that they "don't know" Frontal Teaching Method as it is the most traditional educational method.

15. Which of the following performance assessment methods do you use? 0 - I don't know it, 1 - I know it but I don't use, 2 - I use it sometimes, 3 - I use it frequently, 4 - I use it regularly.

| | 0 - I don't know it | 1 - I know it but I don't use | 2 - I use it sometimes | 3 - I use it frequently | 4 - I use it regularly |
|---|---|---|---|---|---|
| Project evaluation | 5,9% | 11,0% | 28,0% | 32,6% | 22,5% |
| Peer group assessment | 11,4% | 25,0% | 33,1% | 19,9% | 10,6% |
| Portfolio evaluation | 16,5% | 33,9% | 19,5% | 21,6% | 8,5% |
| Peer review | 13,6% | 20,8% | 30,1% | 25,8% | 9,7% |
| Diagnostic assessment | 11,0% | 10,2% | 30,5% | 34,7% | 13,6% |
| Summative (final) assessment | 3,0% | 3,0% | 17,8% | 37,3% | 39,0% |
| Formative (developmental) assessment | 3,4% | 7,2% | 18,6% | 40,7% | 30,1% |




It is interesting to note that while 40% indicate that they use formative assessment, when being asked about the typical formative assessments (project assessment, peer group or portfolio assessment) most respondents indicate that they do not use it. This implies that they are not very familiar with the types of formative assessment.
This contradiction makes us think that these teachers have no idea about formative assessment, and they just ticked this answer.

| | | | |
|---|---|---|---|
|  |  |  |  |
| Hungary | Italy | Lithuania | Spain |

As we can see, portfolio and project-based assessment are the least commonly used evaluation methods. Summative (final) evaluation is common everywhere. In Lithuania, only 3% of the teachers claim to use peer review for assessment that is an outstandingly low rate in this section.

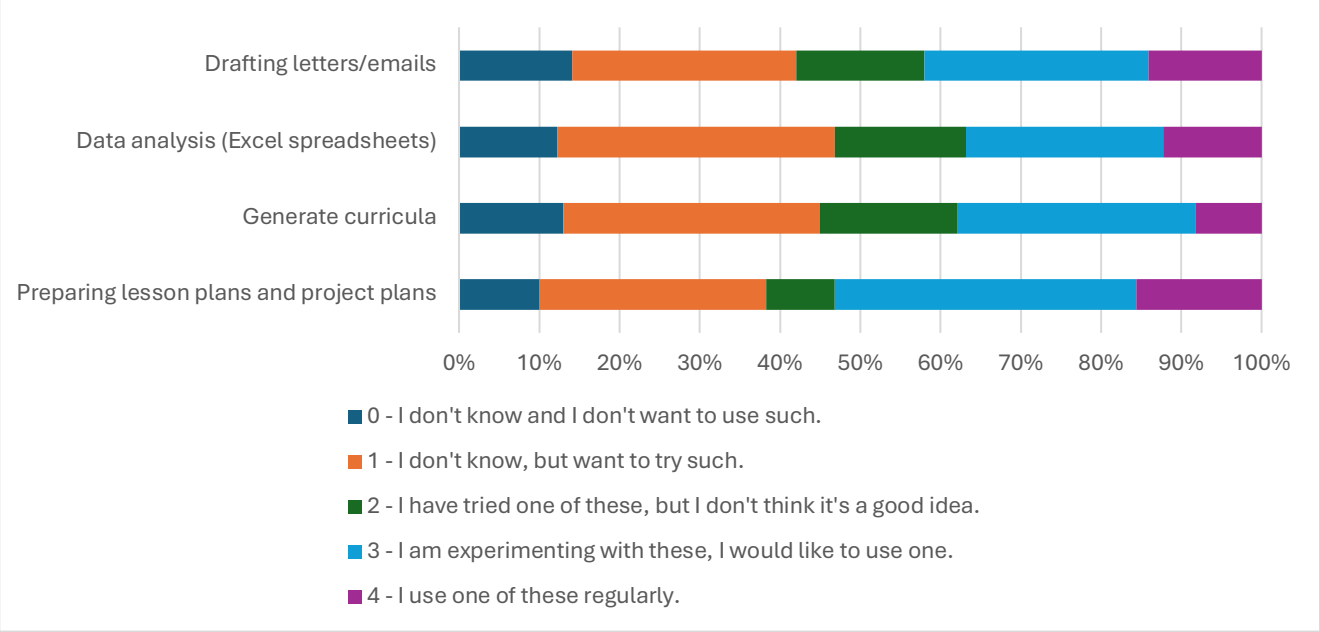
16. **For the following tasks, AI-based tools already exist (Bard, Gemini, ChatGPT). Please indicate how far you know/use these tools. 0 - I don't know, and I don't want to use such. 1 - I don't know but want to try such. 2 - I have tried one of these, but I don't think it's a good idea. 3 - I am experimenting with these, I would like to use one. 4 - I use one of these regularly.**

In all areas, the rate of teachers using the opportunities provided by the AI is very low. Out of these, search is the most commonly one used regularly by almost a quarter of the respondents. This is the highest proportion.

It is noteworthy and very positive that many respondents are experimenting with its use and seeking to take advantage of the possibilities. This is a good perspective.

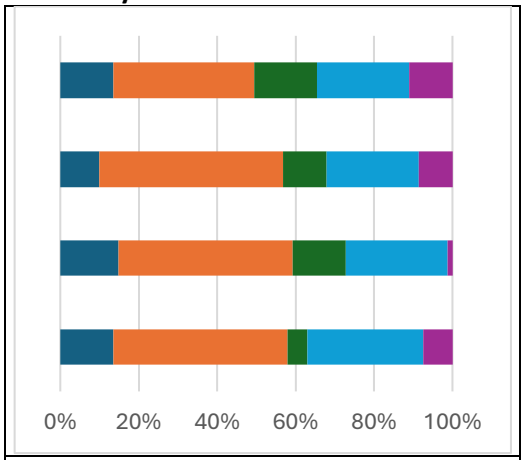
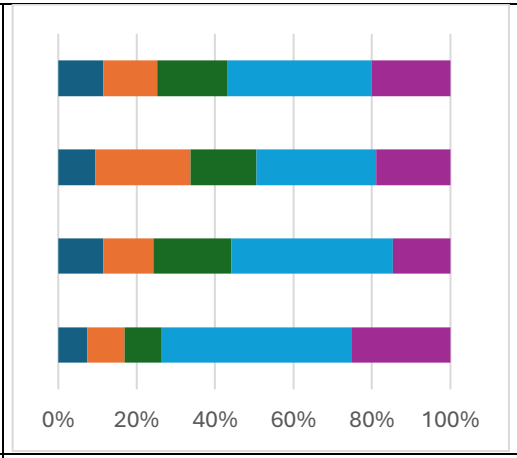
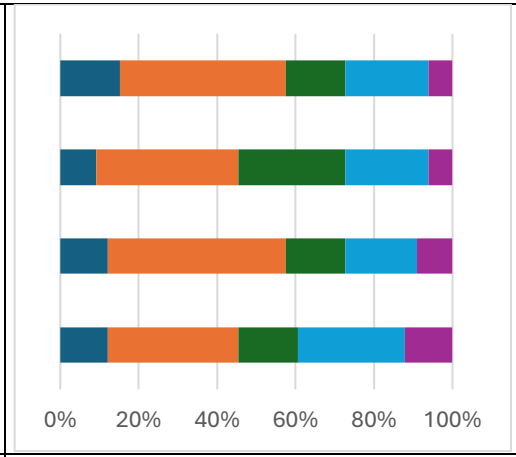
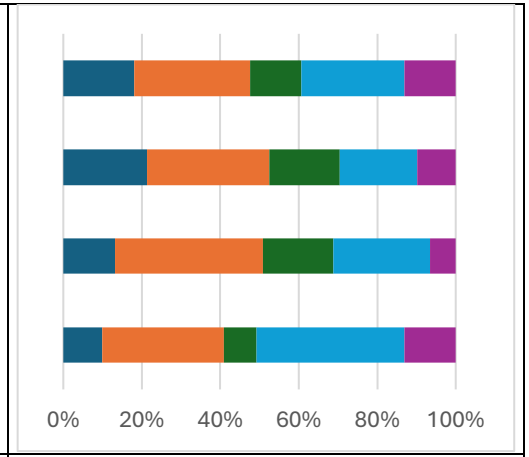
**16.1. Daily routine tasks.**

| Total | 0 - I don't know, and I don't want to use such. | 1 - I don't know but want to try such. | 2 - I have tried one of these, but I don't think it's a good idea. | 3 - I am experimenting with these, I would like to use one. | 4 - I use one of these regularly. |
|---|---|---|---|---|---|
| Preparing lesson plans and project plans | 11,0% | 30,5% | 8,1% | 34,7% | 15,7% |
| Generate curricula | 14,0% | 35,2% | 15,7% | 26,7% | 8,5% |
| Data analysis (Excel spreadsheets) | 12,3% | 36,0% | 16,5% | 23,3% | 11,9% |
| Drafting letters/emails | 14,8% | 28,4% | 14,8% | 26,7% | 15,3% |




The proportion of teachers who are not aware of AI opportunities but are open to these and would like to use these is extremely high.
They would like to use it mostly (37,5%) for preparing lesson/project plans.

**16.1. Daily routine tasks.**

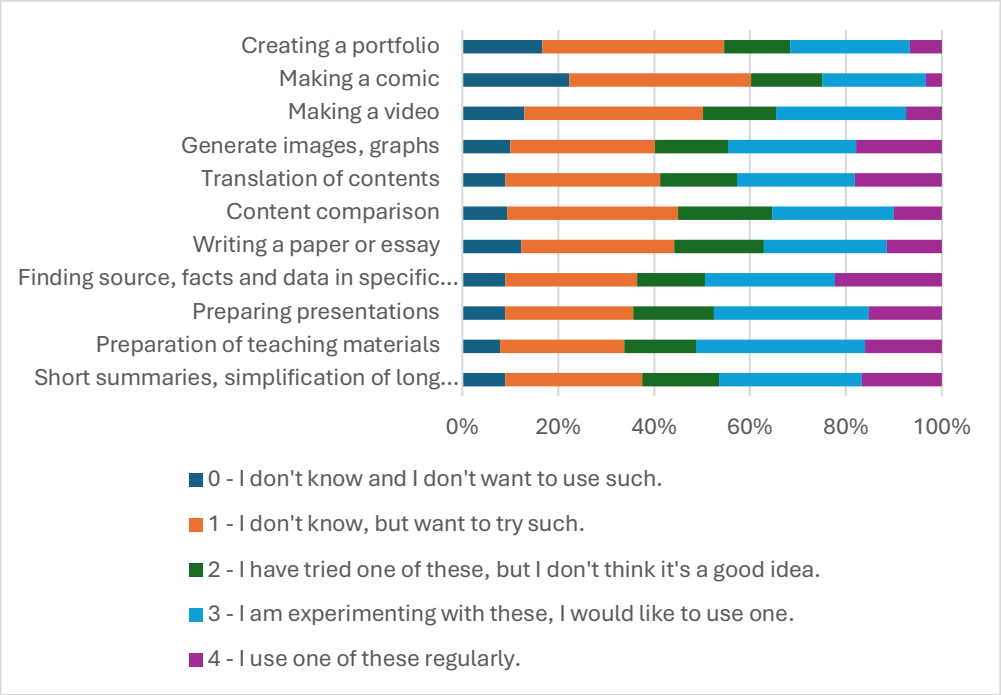
| | | | |
|---|---|---|---|
|  |  |  |  |
| Hungary | Italy | Lithuania | Spain |
| | | | |

Regarding using AI for daily routine tasks, we can see that most Hungarian and Lithuanian teachers as well as the Spanish ones chose the answer “I don’t know it but want to try such” option for each task, that suggests their openness to learn more about Ai tools. Italian teachers responded “I’m experimenting with these, I would like to use on” that implies having risen interest their willingness to improve. 14,7-25,3% of them claims even to use these regularly for one of the enlisted tasks.

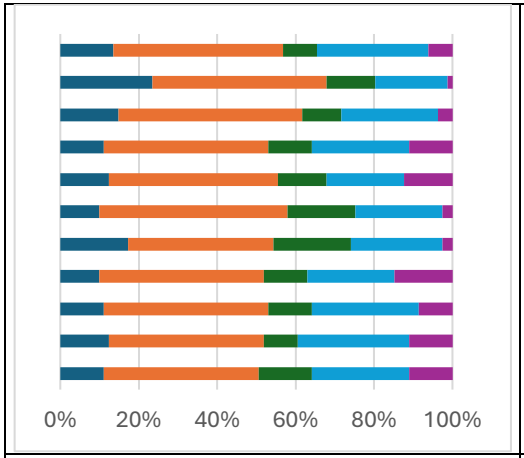
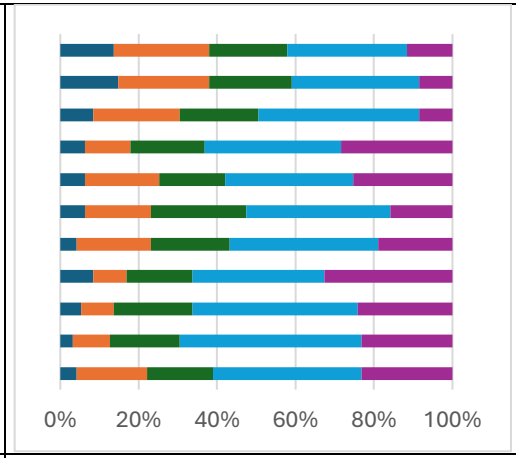
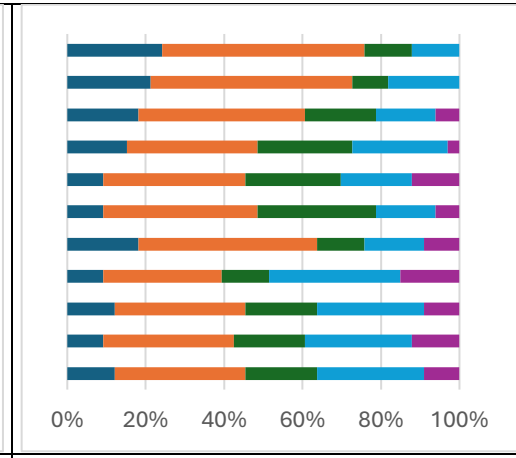
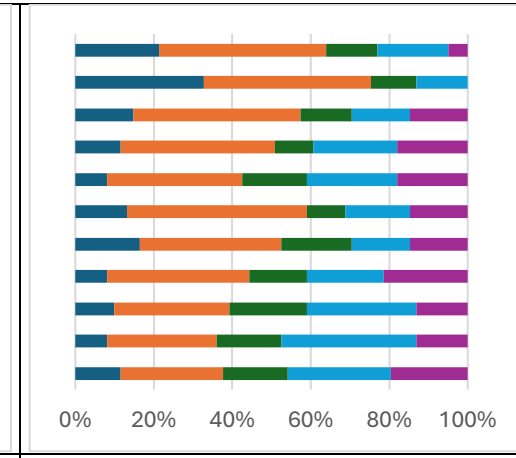
**16.2. Preparing teaching aids.**

| Total | 0 - I don't know, and I don't want to use such. | 1 - I don't know but want to try such. | 2 - I have tried one of these, but I don't think it's a good idea. | 3 - I am experimenting with these, I would like to use one. | 4 - I use one of these regularly. |
|---|---|---|---|---|---|
| Short summaries, simplification of long texts | 9,7% | 30,9% | 14,8% | 28,4% | 16,1% |
| Preparation of teaching materials | 8,9% | 28,4% | 14,4% | 33,1% | 15,3% |
| Preparing presentations | 9,7% | 29,2% | 17,4% | 29,2% | 14,4% |
| Finding source, facts and data in specific topics | 9,7% | 30,1% | 12,7% | 26,3% | 21,2% |
| Writing a paper or essay | 14,0% | 33,9% | 18,2% | 22,5% | 11,4% |
| Content comparison | 10,2% | 38,6% | 17,4% | 23,3% | 10,6% |
| Translation of contents | 9,7% | 33,5% | 16,1% | 22,9% | 17,8% |
| Generate images, graphs | 10,2% | 32,6% | 14,0% | 27,1% | 16,1% |
| Making a video | 13,1% | 38,1% | 15,3% | 25,4% | 8,1% |
| Making a comic | 23,3% | 38,6% | 14,4% | 21,2% | 2,5% |
| Creating a portfolio | 16,9% | 38,6% | 14,4% | 24,2% | 5,9% |

**16.2. Preparing teaching aids.**



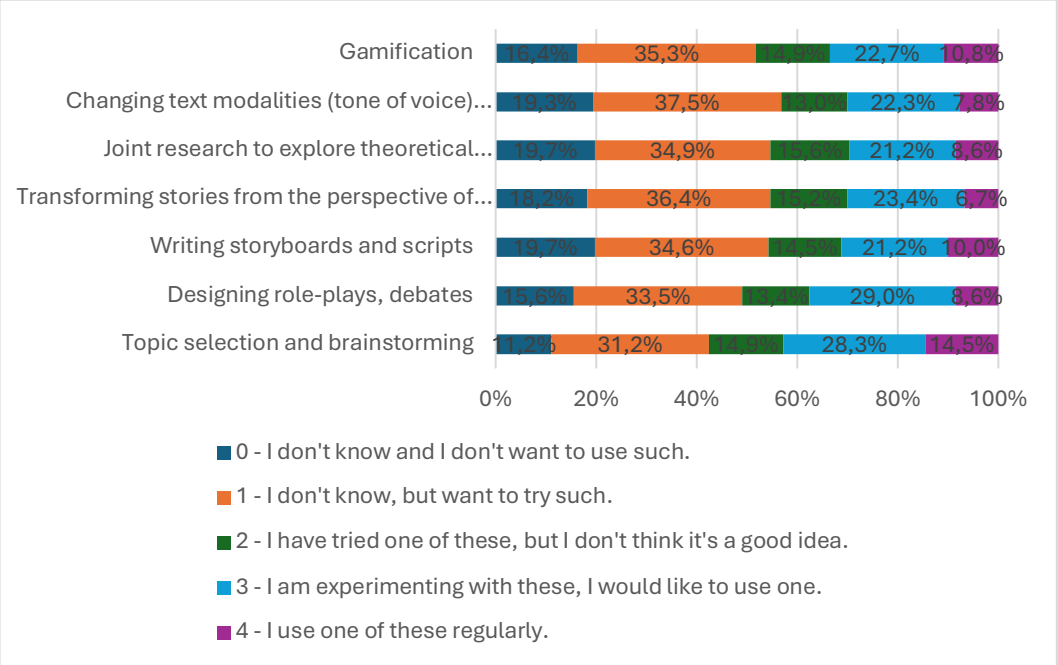

Enquiring about their use of AI tools for preparing teaching aids we can draw the same conclusion as in the previous case. Those respondents who claim to use such “regularly”, use it for “finding source, facts and data in specific topics” the most (22,3%).

| | | | |
|---|---|---|---|
|  |  |  |  |
| Hungary | Italy | Lithuania | Spain |
| | | | |

None of the Lithuanian teachers use AI tools for “Creating a portfolio” or “Making a comics” “regularly”, of which the second is true in case of their Spanish colleagues as well. Regarding the preparation of different type of teaching aids, the majority of responses alters between “I don’t know but I want to try such” and “I’m experimenting with these…” options.

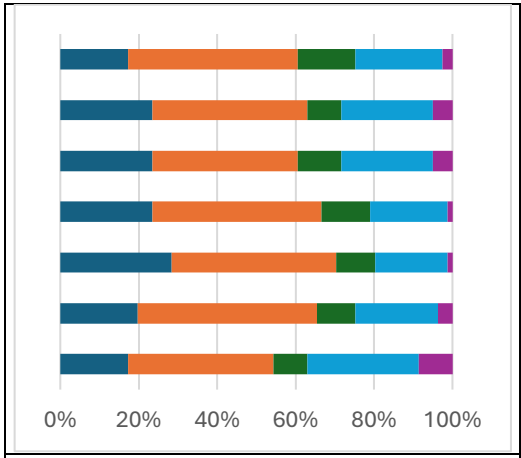
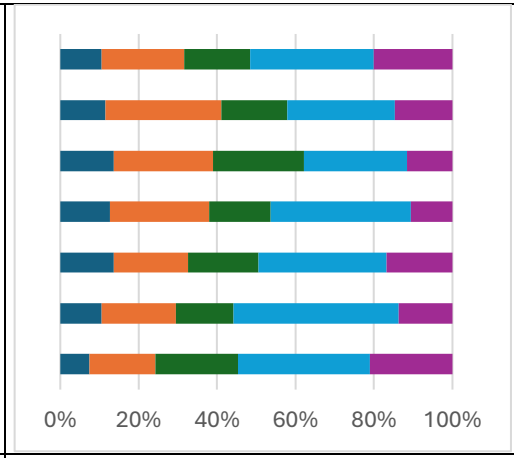
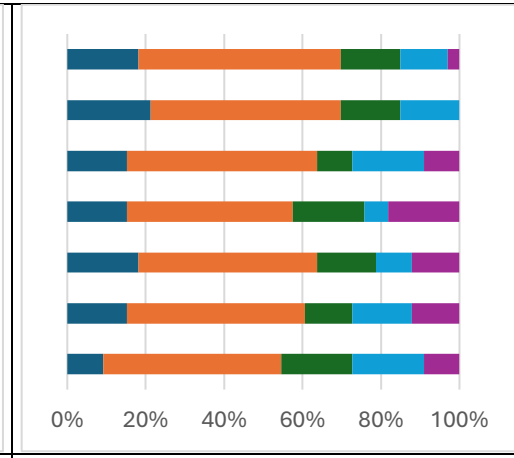
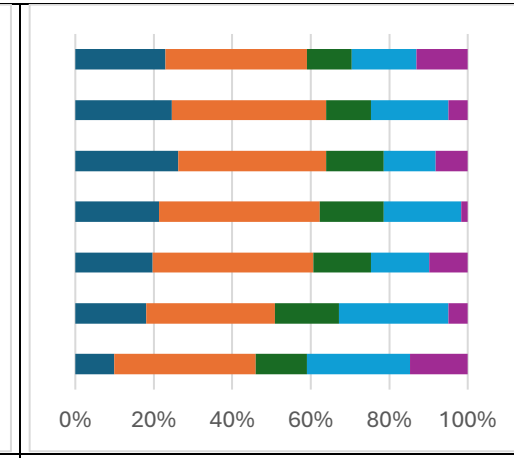
16.3. To collaborate

| Total | 0 - I don't know, and I don't want to use such. | 1 - I don't know but want to try such. | 2 - I have tried one of these, but I don't think it's a good idea. | 3 - I am experimenting with these, I would like to use one. | 4 - I use one of these regularly. |
|---|---|---|---|---|---|
| Topic selection and brainstorming | 11,4% | 33,1% | 13,6% | 28,8% | 13,1% |
| Designing role-plays, debates | 16,5% | 36,0% | 13,1% | 26,7% | 7,6% |
| Writing storyboards and scripts | 20,3% | 36,4% | 14,4% | 19,5% | 9,3% |
| Transforming stories from the perspective of different actors | 18,2% | 38,1% | 14,8% | 22,9% | 5,9% |
| Joint research to explore theoretical connections | 20,3% | 35,2% | 14,4% | 22,5% | 7,6% |
| Changing text modalities (tone of voice) (humorous, authoritarian, enthusiastic, casual, schoolboy, simplistic, etc.) | 19,9% | 36,9% | 12,7% | 23,3% | 7,2% |
| Gamification | 16,5% | 37,3% | 14,8% | 22,0% | 9,3% |




The result shows that more above 30% of the respondents indicated the answer “I don’t know it but want to try such” when asked about using any AI-based tools for different types of collaboration. The lowest percentage stands for the answer "regularly" in case of each collaboration type.

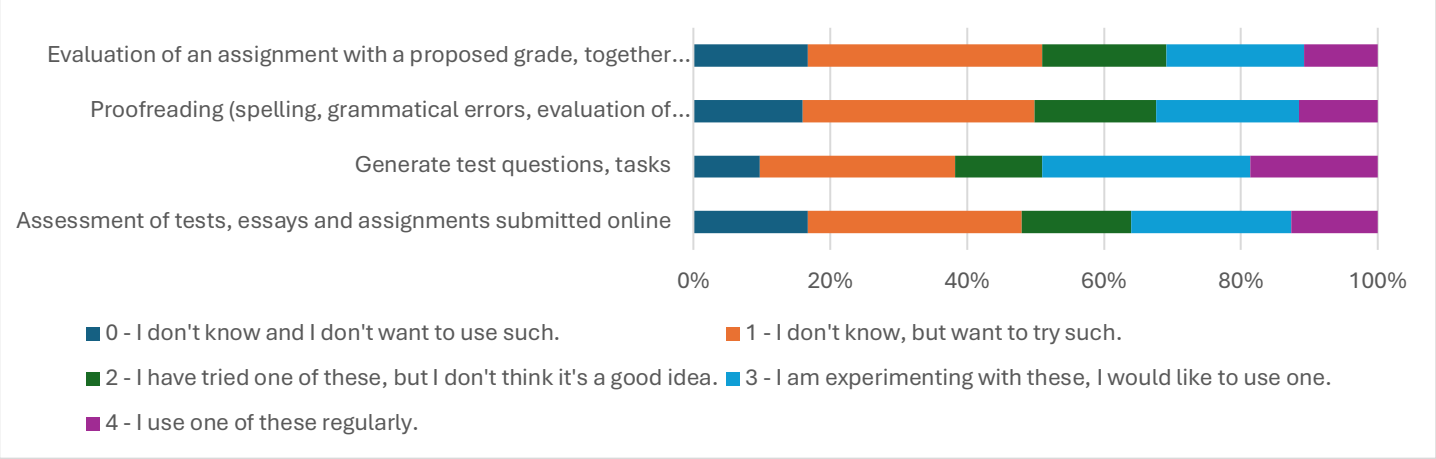
16.3. To collaborate

| | | | |
|---|---|---|---|
|  |  |  |  |
| Hungary | Italy | Lithuania | Spain |
| | | | |

The diffusion of the selection rate of respondents is similar to those in 16.1, 16.2, 16.3.

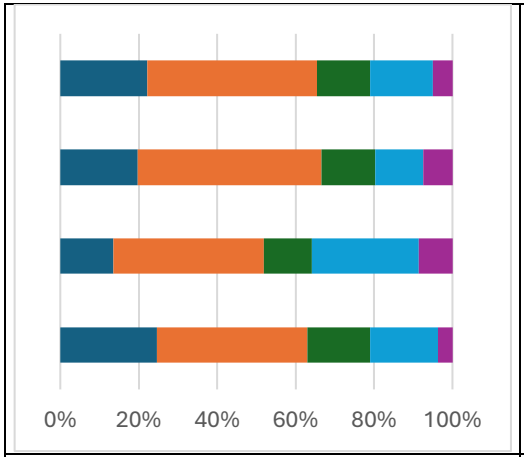
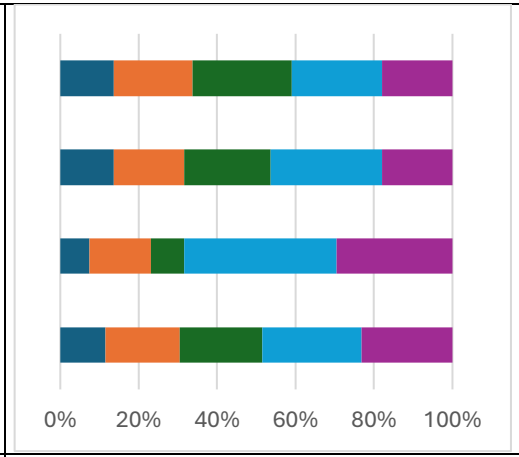
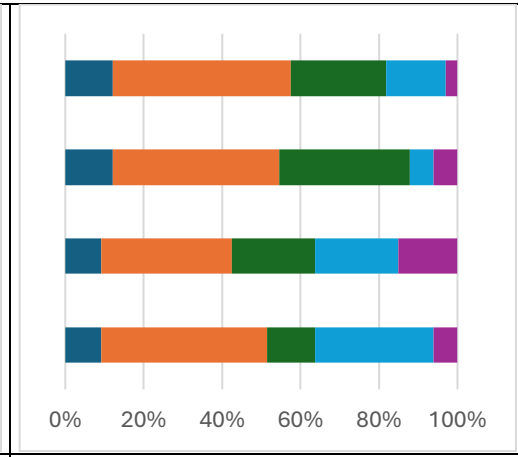
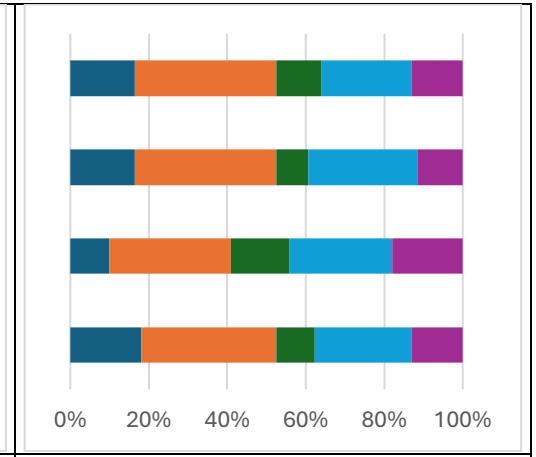
16.4. To evaluate

| Total | 0 - I don't know, and I don't want to use such. | 1 - I don't know but want to try such. | 2 - I have tried one of these, but I don't think it's a good idea. | 3 - I am experimenting with these, I would like to use one. | 4 - I use one of these regularly. |
|---|---|---|---|---|---|
| Assessment of tests, essays and assignments submitted online | 17,4% | 32,2% | 14,4% | 24,2% | 11,9% |
| Generate test questions, tasks | 10,6% | 30,9% | 13,1% | 28,8% | 16,5% |
| Proofreading (spelling, grammatical errors, evaluation of structure and content) | 16,5% | 36,9% | 14,8% | 21,2% | 10,6% |
| Evaluation of an assignment with a proposed grade, together with the reasons for the grade. | 17,4% | 35,6% | 16,5% | 19,9% | 10,6% |




More than third of the respondents expressed willingness to try AI-based tools for each evaluation action (32,2%-35,6%) expressively for “Proofreading (spelling, grammatical errors, evaluation of structure and content)”.

16.4. To evaluate

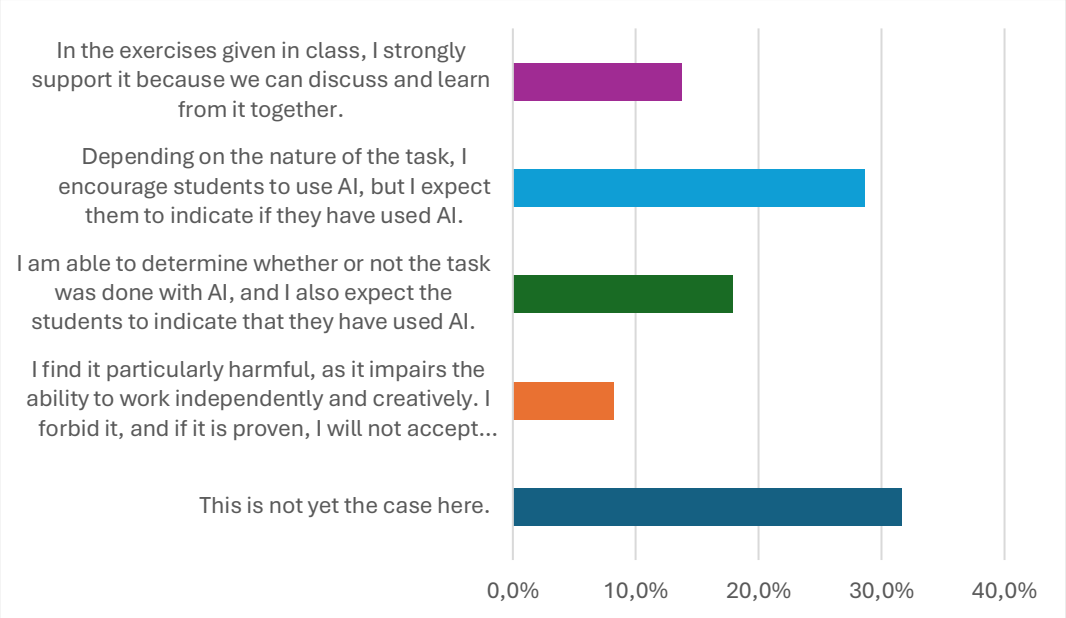
| | | | |
|---|---|---|---|
|  |  |  |  |
| Hungary | Italy | Lithuania | Spain |
| | | | |

The variance of the response rate of the respondents is similar to that described in 16.1, 16.2 and 16.3. Among Hungarian, Lithuanian and Spanish teachers, the ambition to use AI-based tools for assessment seems to be high, as about 40% of them chose the option "I don't know but I want to try it", while among Italian teachers, many are already in the experimental phase with AI-based tools for assessment or use such regularly.

**17. Recent surveys show that students often do their homework with AI. How do you feel about this, how do you handle this situation?**

| | | Total | Hungary | Italy | Lithuania | Spain |
|---|---|---|---|---|---|---|
| This is not yet the case here. | | 31.37% | 41.98% | 25.26% | 39.39% | 23.73% |
| I find it particularly harmful, as it impairs the ability to work independently and creatively. I forbid it, and if it is proven, I will not accept the solution. | | 8.49% | 8.64% | 6.32% | 12.12% | 8.47% |
| I am able to determine whether or not the task was done with AI, and I also expect the students to indicate that they have used AI. | | 17.71% | 20.99% | 15.79% | 9.09% | 20.34% |
| Depending on the nature of the task, I encourage students to use AI, but I expect them to indicate if they have used AI. | | 28.41% | 20.99% | 32.63% | 21.21% | 37.29% |
| In the exercises given in class, I strongly support it because we can discuss and learn from it together. | | 14.02% | 7.41% | 20% | 18.18% | 10.17% |
| No Answer | | 0% | 0% | 0% | 0% | 0% |

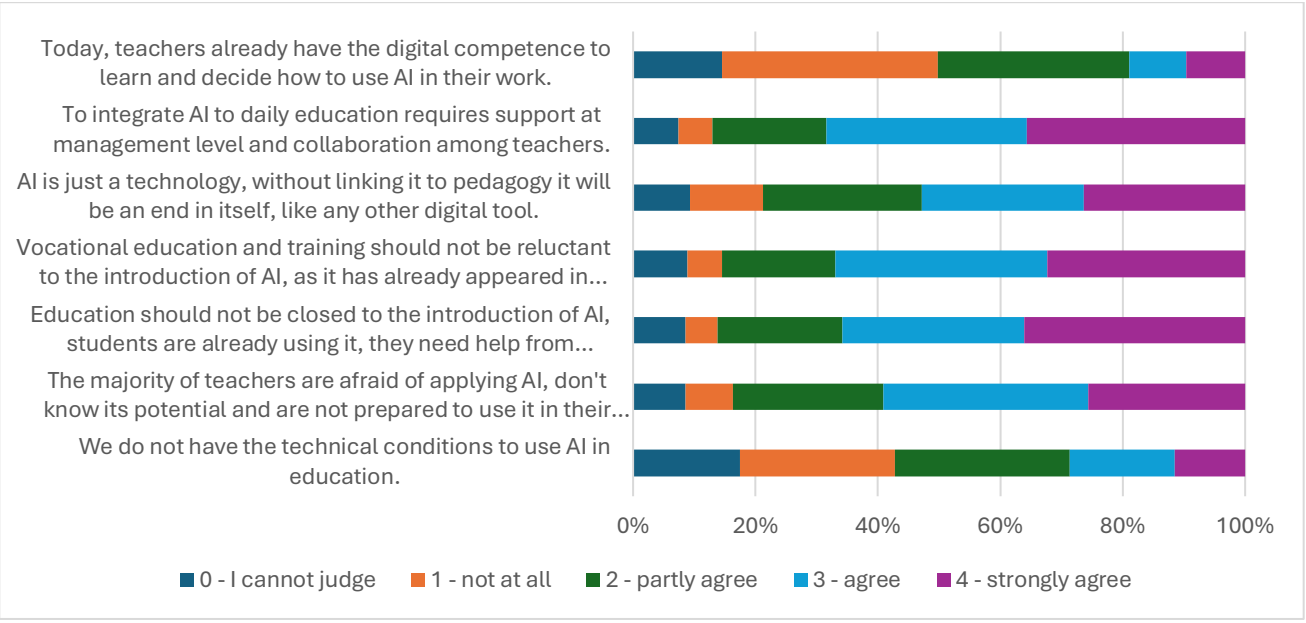
Around 40% of Hungarian and Lithuanian teachers state that they haven' experienced such yet. The third of the Italian and Spanish teachers who seem to be more exposed to this problem indicated the answer "Depending on the nature of the task, I encourage students to use AI, but I expect them to indicate if they have used AI."




In terms of the overall response, 32% of teachers do not yet think that students would use AI for assignments, but nearly half of teachers have a positive attitude and nearly 10% a negative one.

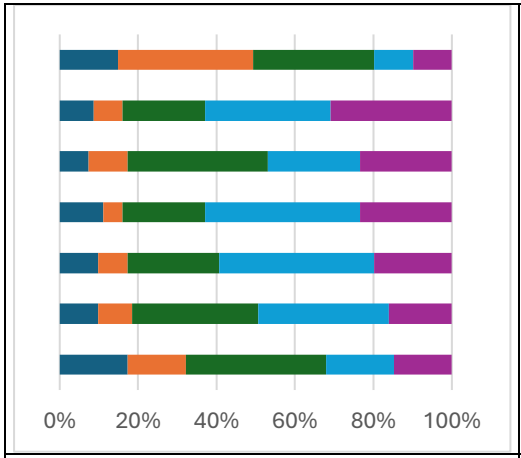
**18. To what extent do you agree with the following statements 0 - I cannot judge, 1 - not at all, 2 - partly agree, 3 - agree, 4 - strongly agree**

| Total | 0 - I cannot judge | 1 - not at all | 2 - partly agree | 3 - agree | 4 - strongly agree |
|---|---|---|---|---|---|
| We do not have the technical conditions to use AI in education. | 16,9 % | 25,4 % | 27,5 % | 18,2 % | 11,9% |
| The majority of teachers are afraid of applying AI, don't know its potential and are not prepared to use it in their teaching. | 8,1% | 8,9% | 24,6 % | 33,1 % | 25,4% |
| Education should not be closed to the introduction of AI, students are already using it, they need help from teachers to use it correctly. | 8,9% | 5,9% | 22,5 % | 28,4 % | 34,3% |
| Vocational education and training should not be reluctant to the introduction of AI, as it has already appeared in most professions and the labour market needs workers who are able to apply AI. | 9,3% | 5,9% | 20,3 % | 33,9 % | 30,5% |
| AI is just a technology, without linking it to pedagogy it will be an end in itself, like any other digital tool. | 10,2 % | 12,3 % | 26,3 % | 27,1 % | 24,2% |
| To integrate AI to daily education requires support at management level and collaboration among teachers. | 7,6% | 6,4% | 19,1 % | 33,9 % | 33,1% |
| Today, teachers already have the digital competence to learn and decide how to use AI in their work. | 15,3 % | 34,3 % | 32,6 % | 8,9% | 8,9% |

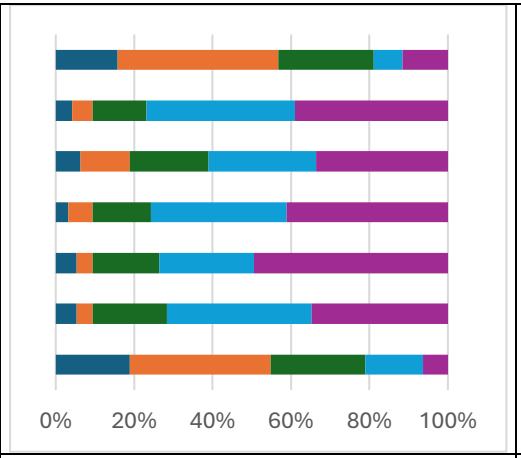



**A very high percentage of teachers indicate that most teachers are afraid of AI.** They do not know the possibilities and are not ready to use it yet. However, they are aware that it is important, and that vocational education should be open to its use!

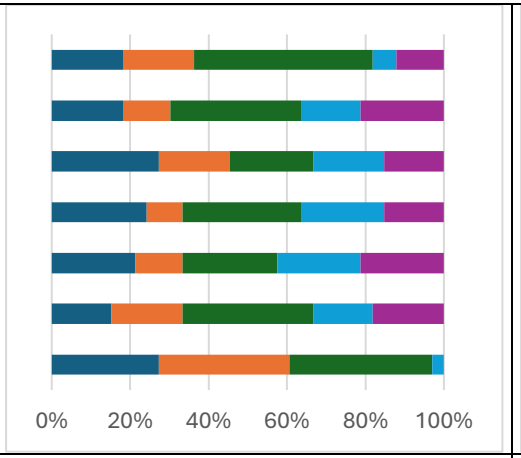
Most teachers believe that students are not yet using AI for their assignments. This is a very optimistic view. In Italy and Spain, most teachers are more realistic and encourage students to use the new technology but expect them to indicate its use.



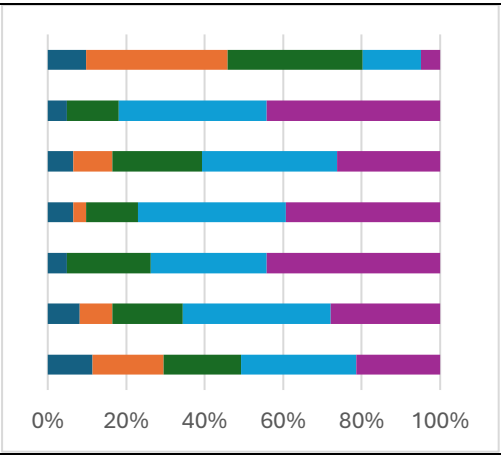

Hungary




Italy




Lithuania




Spain

Over the third of Hungarian, Italian and Spanish teachers think that “Today, teachers have already the digital competence to learn and decide how to use AI in their work.“, while only 18,2% of the Lithuanian teachers think the same. Although they appear to rate their digital competence relatively low, only 3% “agrees” that they don’t have the technical conditions to use AI in education.

Almost half of the Italian and Spanish respondents “strongly agrees” with the statement that “Education should not be closed to the introduction of AI…” with 39,5 of Hungarian respondents indicating “agree” on it. Lithuanian teachers have the biggest proportion of those who claim they “cannot judge “upon this ((21,2%). This implies that teachers rating their digital competences as lower are less courageous to use new technologies like AI for education