

Teacher-led digitalisation

Opportunities and caveats on the threshold of a new AI landscape

Swedish
Teachers'
Union



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Foreword

In this report, Swedish Teachers' Union (Sveriges Lärare) show how our members view digitalisation and Artificial Intelligence (AI) in the education system and what they think it means for children's and students' learning.¹ Increased digitalisation is not an end in itself, but a tool to improve teaching. It is therefore crucial that teachers are involved in the entire digitalisation process from acquisition to use and development. There must be room for collegial discussions on digital working methods and employers must provide opportunities for continuous skills development. Resources and conditions for practice-oriented research on digital teaching methods should also be given greater priority by both employers and research funders, as this contributes to knowledge development and the development of best practice.

Despite growing interest in AI in the education sector, its use in the classroom remains rare. In contrast, the use of other digital tools and learning materials is widespread. The survey shows that three out of five teachers in primary, secondary, and adult education use digital tools in most lessons. In early childhood education, almost all teachers use digital tools mainly to document teaching, while less than a third use digital tools to help children practice skills and abilities.

Teachers take a cautious approach to AI. They recall previous digitalisation investments, led by eager education providers, that went fast but wrong. Teachers see the future potential of AI but are concerned about ethical aspects, about students cheating with AI, and about school boards and principals making hasty AI investments that could lower the quality of learning materials and, by extension, teaching.

At its core, digital literacy is a matter of democracy. It is therefore with concern that we see a lack of equality in schools and major differences in how children and pupils are given the opportunity to develop their skills in this area. The Swedish school system is therefore in great need of a national strategy that points out a direction for the digitalisation of the school system. This report shows that this cannot be left to school principals alone. On the contrary, a stronger national approach needs to be taken to strengthen the equality of education and support principals in terms of expertise. It is therefore regrettable that the government seems to be opting for a policy that slows down necessary digital development, rather than helping education providers and principals to take the right measures.

As we stand on the threshold of a new AI landscape, it is crucial that teachers are given the time and opportunity to customise and design AI tools to support good teaching. Technological developments need to be based on wise investment in the teaching profession.

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¹ *Teacher-led digitalisation* has been AI translated from Swedish using DeepL and corrected by the original human authors. The original Swedish version *Lärarylled digitalisering* can be found at sverigeslarare.se/undersokningar

² Sveriges Lärare (Swedish Teacher's Union) was formed January 2023. Swedish Teacher's Union is a merger of two previous trade unions: Lärarförbundet och Lärarnas Riksförbund. This report contains references to earlier reports from all three organisations.

Summary and conclusions

The study shows that digital learning tools are part of the everyday lives of pre-school teachers and teachers, and that the use of Artificial Intelligence (AI) in teaching is limited.

Digital learning tools have multiple functions in education. They are used to instruct, inspire, plan, document, evaluate, activate and more. In preschool, technology is used to create backdrops for the play environment, for creative work or to play music for dance and movement. The way digital learning tools are used in preschools does not match the simplistic picture presented in the media.

The survey shows that pre-school teachers and teachers across the school system weigh up the pros and cons before choosing to use digital learning tools. However, there are several circumstances that prevent teachers from acting fully professionally when it comes to using digital learning tools in teaching. One example is the misinvestment in learning platforms and the procurement of digital learning materials that may not be suitable for everyone. Other circumstances affecting use include the failure to repair or replace hardware and equipment that breaks or becomes obsolete. Moreover, teachers and pre-school teachers rarely receive technical support when needed. Pedagogical support in working with digital learning tools also seems to have decreased since 2020 when it was last surveyed (Lärarförbundet, 2020).

AI poses new challenges for the school system and must be addressed through increased competence development at all levels of the governance chain. These processes must take place within the framework of collaboration and systematic work environment management. The definitions of learning materials and learning tools in the Education Act also include AI tools, which is why the same requirements for quality review as for other learning tools must be imposed on them before they are used in the school system.

- The government should therefore urgently appoint a broad commission tasked with producing a research review on the use of digital learning tools and AI in education, and using this as a starting point, in collaboration with representatives of the profession, produce national guidelines. The research review must also address legal and ethical issues.

Both digital and analogue learning tools and continuous professional development. Pre-school teachers and teachers want to use both digital and analogue learning tools; contrary to the way the political debate has developed, teachers think both/and rather than either/or.

The areas where pre-school teachers and teachers believe new AI technology will be useful are primarily administration and planning. Here it should be borne in mind that teachers rate their own level of expertise in AI as fairly low, which is why their views on both advantages and disadvantages may change as they acquire more knowledge in the field. Teachers see it as a possible development that, as the use of AI increases, teaching will need to focus more on core values, criticism of the sources and analytical thinking than today. Many of teachers emphasise that they want competence development on AI and opportunities to discuss and reflect together as a team before they start using the technology in teaching.

Pre-school teachers and teachers want to rush slowly to introduce AI in teaching.

There is currently no robust evidence to answer whether AI can contribute to higher quality teaching. The union is therefore concerned that education providers and school boards will rush too quickly and make large investments in tools that are not suitable for use in teaching. There are also ethical and human dilemmas with AI that pre-school teachers and teachers need time and opportunity to explore.

The collective experience of how politicians and education providers pushed for rapid digitalisation without considering either research or the professional judgments of the teaching profession contributes to the ongoing development being viewed with a certain, healthy, scepticism. There are currently no AI tools developed for teaching in accordance with Swedish curricula. This means that, yet there are no AI tools that fulfil the requirements of the Education Act for teaching materials. Of course, there is nothing to prevent pre-school teachers and teachers from testing different AI tools. However, replacing other learning materials with AI is, so far, not compatible with the requirements of the Education Act on students' right to learning materials.

Education providers need support and training. Pre-school teachers and teachers are concerned that education providers and school boards will make poorly informed investments in AI technology. The same applies to digital learning tools in general; before investments are made, pre-school teachers and teachers want competence development that increases their digital and AI literacy, both for themselves but perhaps even more for those who make decisions about major investments.

An important investment by the government is **training to develop the procurement skills of those responsible for procurement in the municipalities.** Similar support measures should be provided to individual principals. Procurement expertise regarding digital tools in the school system must include knowledge of the requirements of the Education Act on learning materials and learning tools.

Competence development at all levels is a prerequisite for increasing the level of collaboration and participation. It is also necessary to improve the systematic working environment of organisations in the field of digitalisation.

Digitalisation and AI issues are neither an obvious part of the organisations' systematic work environment management nor something that is managed in collaboration with the trade unions. The digital work environment is rarely included in the organisations' systematic work environment management. If, for example, digital safety rounds and/or risk assessments are carried out when new systems are introduced, there is a serious lack of communication as it is not something that pre-school teachers or teachers are aware of.

- Education providers and head teachers must, to a greater extent than today, ensure that risk and impact analyses are carried out at local level when introducing and/or revising digital learning tools, including AI tools, in the school system. Digital work environment must be part of the systematic work environment management and pre-school teachers and teachers must be given real opportunities to participate in collaboration in this area.
- The school system is Sweden's largest workplace, which is why the Swedish Work Environment Authority should be tasked with scrutinising the digital work environment in the country's preschools and schools.

Development is not free. We are in a situation where it is important to ensure that AI development does not lead to misinvestments that in turn create displacement effects in other areas. The education system is currently underfunded, which is why new investments are not possible unless more funds are injected into the system.

- There is a real risk that education providers will draw the wrong conclusion that the use of AI tools means that operations can be streamlined in such a way that the investments pay off at some other end. The digitalisation of society has made many parts of the education system and the labour market more efficient, but it has also increased costs. A similar development in terms of AI tools is therefore likely.
- The need for competence development, national coordination and governance, more oversight and scrutiny of organisations' digital work environment, and the establishment of a broad commission are actions that need to be funded.

Introduction

In 2023, the Swedish school digitalisation debate was heated, with technology zealots on one side and politicians wanting to pull the handbrake on the other. Politicians made several decisions that indicated a desire for the school system to return to being a more analogue activity; a teaching material subsidy for mainly printed teaching materials was introduced, the national digitalisation strategy was scrapped and an investigation into removing the requirements for digital learning tools in the pre-school curriculum was decided. At times, the public debate became so polarised that the debate itself seemed to have lost its way.

Pre-school teachers' and teachers' experiences of the conditions and challenges of the school system in a digitalised world need to be made visible and problematised to have a more nuanced discussion. Such a dialogue is necessary to provide decision-makers at all levels with a basis for making the most thoughtful and wise decisions possible. The everyday lives of teachers in the education system are far more complex than the challenges that exist can be solved simply by adding or subtracting technology.

Technology is evolving rapidly. There is talk of a paradigm shift as the various tools based on artificial intelligence (AI) become more and more accessible. It is easy to think of AI as an opportunity for change where schools should not be last on the ball.

But while everyone working in the education system is acquiring more knowledge about AI technology, there must be time and space to reflect on what the introduction of AI in education can mean. Will teaching be better if AI is used and is it possible to distinguish between good and bad AI? What ethical and legal issues need to be addressed if AI is to be introduced in schools? Do pre-school teachers and teachers think their roles might change if AI tools start to be used as one learning tool among others? What is desirable and undesirable?

Aim of the survey

The purpose of this member survey is to investigate pre-school teachers' and teachers' prerequisites and conditions when it comes to digitalisation in the school system today, and to map how teachers reason about AI and what they see as possible consequences for children's and students' learning. The questions are:

1. To what extent do teachers currently use digital learning tools³ and AI in their teaching?
2. What advantages and disadvantages do teachers see in using digital learning tools?
3. How do teachers think their role and mission might change with AI?
4. What is the current state of the digital infrastructure and work environment in your organisation?

³ As of 1 July 0, the wording of the Education Act (SFS 2010:800) will change and a new definition of learning materials will be introduced. The concept of learning tools is changed to make the boundaries between different materials used in teaching clearer. Learning materials is a broad concept and includes "textbooks, other learning materials and other printed or digital works, as well as equipment and materials used in teaching." (SFS 2010:800) It is in this, broad, sense that the term learning tool is used in the study.

Background

Teachers recall a digitalisation journey that went fast but wrong

The digitalisation of Swedish schools has been going on for over thirty years. It has gone through several different phases, from investment in hardware, such as computers and connectivity, to the development of regulations, standards, conceptual use, and technical protocols, to having specific ICT expertise in preschools and schools. Several initiatives have been implemented in the Swedish school system and in the following chapter we review some of these and the possible effects they have had.

“One pupil, one computer” did not lead to better learning outcomes

The ‘one pupil, one computer’ initiative – whereby every pupil has a laptop or tablet to use both inside and outside the classroom – has been implemented in most Swedish primary and secondary schools over the past 15 years. The aim was to make students more digitally competent while improving learning. IFAU’s 2019 study⁴ shows that the initiative has had neither positive nor negative effects on national test results, or on students’ transition to upper secondary school. There is some negative effect in the subject of Mathematics among students with parents with lower education and slightly worse results in Swedish (IFAU, 2019). In other words, “One pupil, one computer” does not seem to have lived up to the part of its purpose that was to increase knowledge results.

Education providers invested more in technology than in pedagogy

The education providers investments in the purchase of computers and tablets were not combined with correspondingly large investments in teachers’ professional development in the area. The Swedish National Agency for Education notes that a quarter of teachers still feel that the opportunities for professional development are quite or very poor (Skolverket, 2018). The OECD’s international TALIS survey shows similar results. Almost one in three teachers felt that the professional development they had received had not had a positive effect (Skolverket, 2018). Skills development needs and the role of digital learning tools in teaching have been poorly mapped before major investments. Nor was the possible impact on teachers’ work situation investigated (Skolverket, 2021). The same study shows that few pre-school teachers and teachers have received appropriate skills development (Skolverket, 2021).

Increased digitalisation has not always freed up teachers’ time

Increased digitalisation has led to new challenges in the school system and ‘technology clutter’. Poor networks and a lack of IT support have become new disruptive factors to deal with (Lärarnas Riksförbund, 2020; Lärarförbundet, 2021). Digital learning platforms have in some cases led to increased documentation and many teachers have been forced to double-document as the platforms are not fit for purpose (Lärarförbundet, 2019). Few teachers believe that digital solutions have improved the work with documentation and administration (Lärarnas Riksförbund, 2020).

⁴ The study covers around 50 000 secondary school students and was conducted between 2008 and 2016.

Pandemic shock digitalization prompted teachers to try new ways of working

The COVID-19 pandemic forced preschools and schools to change overnight in spring 2020. In primary and secondary schools, as well as in adult education, digital distance learning suddenly became necessary. The fact that digital infrastructure was in place made the transition relatively smooth in most organisations. However, it was not entirely painless and many experienced increased workloads, reduced study peace and a poorer work environment (Läraryrbundet, 2020). However, the lesson from the pandemic is that pre-schoolteacher and teachers are quick to try out new digital working methods when there is a real need. During the period of distance and distance learning, the importance of the physical meeting between teacher and student was highlighted in several ways.⁵

Current cuts and savings limit the potential of digitalisation

The lack of access to both analogue and digital learning materials affects teachers' professional practice. In some cases, education providers have decided that an entire college should use certain digital learning materials, often due to favourable agreements, which has meant reduced opportunities for teachers to provide good quality teaching (Sveriges Lärare, 2023). The limited resources of the school system and the high workload of teachers affect the extent to which the benefits of digital learning tools are realized.

Digital equivalence

The school's compensatory mission entails a great responsibility to work for equality in terms of children's and students' digital competences and abilities. In the study Digital (in)equality ICT use in schools and pupils' technical capital, Samuelsson finds that there is a digital inequality among young people, even though they have great access to IT. The study also shows that schools are unable to offer students digital equality and compensate for differences in digital skills (Samuelsson, 2014). Although the study is a few years old, there are still shortcomings in terms of equality in digital skills and there may be a risk that the gaps will widen in connection with the introduction of AI in the school system.

Multiple agendas have driven the use of technology in schools

Increased use of technology in the school system has been influenced by many different agendas, such as increased Swedish and European competitiveness, skills supply to tech companies, and a narrative that digitalisation opportunities can contribute to the public sector's efficiency requirements (SOU 2014:13, Techbranschen 2023, SKR 2023).⁶ Among the actors who have had a major influence on driving an agenda of increased use of technology in the Swedish school system are political representatives at several national levels and within the EU. Industry has also been a driving force (Tech Sverige, 2020) (SKL, 2019).

"ICT for all – a digital agenda for Sweden" was the government's vision of a Sweden that was the best in the world in using the possibilities of digitalisation.⁷ According to the 2011 agenda, all schools should have computers and be connected. Eventually, a national digitalization strategy for the school system was developed, which the current government has scrapped.⁸ The European Commission was concerned that Europe would lose competitiveness, especially vis-à-vis

⁵ Early childhood education children were allowed to continue their stay in the preschool.

⁶ All these agendas are important for Sweden, but they are not always agendas that favour the school system.

⁷ The same objectives remain today for Sweden.

⁸ The same was abolished in 2023 by the current government.

the United States, and initiated “Open Education”; efforts to create more open learning environments where the new open technologies (the internet) would make it “possible for everyone to learn anywhere, anytime, anyhow, with the support of anyone” (SOU 2014:13).

The skills provision of Swedish tech companies has been an important issue that has also affected the education system. The industry has a turnover in the billions and tax revenues are significant (Techbranschen, 2023).⁹ The companies have a great need for labour, which also influenced certain formulations in the National Digitalisation Strategy of the school system. Schools have also been given a responsibility to create an interest in digital technologies to meet this need.

Previous Swedish governments and SKR imagined that digitalisation would promote knowledge development, increase equality, and make the school system more efficient. An ambitious #Skoldigiplan was developed in 2019 (SKL, 2019). Although it is far from being implemented, SKR still talks about how digitalisation will provide “opportunities to streamline operations, automate and broadly introduce new ways of working and services” (SKR, 2023). Nowadays, it is AI technology that the Ed Tech industry claims “will have a broad impact on education and drive new ways of working and solutions” (Swedish Edtech industry, 2023) and that the technology “reduces teachers’ workload and develops teaching” (Swedish Edtech Industry, 2022).

Does technology contribute to better teaching and learning?

The government and education providers have a role to play in preparing children and students for increased digitalization in society. But more digital learning tools and an even more digitised school system do not automatically mean higher quality teaching or increased learning. Studies from the last two decades report only a small to medium positive effect on children’s and students’ learning when educational technology is used (UNESCO, 2023, p. 67). Moreover, the studies are usually limited and context-based and may therefore mask other educational factors that have influenced the outcome.

According to UNESCO research, digital technologies can contribute to teaching and learning in two possible ways. Either by “reallocating resources, increasing opportunities for practice, supplementing instructional time and customising instruction” (Escueta et al., 2020; Ganimian et al., 2020; Major et al., 2021 in UNESCO 2023) or “engaging and supporting learners by varying the way content is presented, stimulating interaction and fostering collaboration” (UNESCO, 2023:69). However, there is no evidence that technology has significantly changed teachers’ teaching practices (Reich in UNESCO 2023).

Increased use of technology has also been shown to be directly harmful to children and students in some cases. Excessive use of technology can be linked to reduced academic progress according to the latest analysis of PISA 2018 (UNESCO 2023). Mobile phone use can also have some negative effects.¹⁰ This is mainly due to increased distraction and time spent on non-academic activities (Kates et al 2018 in UNESCO 2023). The high level of online learning during the pandemic negatively affected younger students (UNESCO 2023).

⁹ The tech industry’s turnover in 2022 was more than SEK 1 trillion and its contribution to GDP totalled SEK 350 billion. This means tax revenues of over SEK 150 billion.

¹⁰ A meta-analysis of research between 2008 and 2017 on the relationship between student mobile phone use and educational outcomes, covering students from pre-school to higher education in 14 countries, found a small negative effect, which was larger at university level.

Can Artificial Intelligence contribute to better teaching?

What is Artificial Intelligence?

AI is a term that has been used since 1956 and is a field of computer science that emerged from cybernetics.¹¹ A simple definition is “the ability of computers or other machines to exhibit or simulate intelligent behaviour” (Holmes, 2023). Open AI launched on 30 November 2022 Chat GPT which has influenced the technology landscape. AI was then allowed to be tested on a large scale by many people around the world.

AI has undergone exponential development since the launch of Chat GPT. The technology used has been around for many years but what we see now is a race among the big tech companies where ethical dimensions and human rights have not been prioritised (Holmes, 2023).

AI tools for the education sector

The AI tools for education available today can be divided into three categories depending on who is intended to use them: students, teachers, or the organisation/institution. For student use, there are customisable learning systems, apps with embedded AI for maths or language learning, AI-powered simulations (VR, AR, gamification), chatbots and much more. Teachers can use AI tools for activities such as updating learning materials, classroom monitoring and automatic summative assessment. At the organisational level, AI tools take care of everything from admissions, course planning and scheduling to school safety and identifying students at risk (Holmes, 2023). The Swedish school system has not yet seen the full range as several of the AI tools are not yet available in Sweden.

The recently adopted EU AI Act will also influence which AI tools will be available on the market (European Council, 2024).¹²

Research on AI tools in education

Several AI tools designed for student use aim to take over the teacher’s role in some respect by having adaptive computer-supported instruction¹³, AI assistants or chatbots. Research in this area has been conducted over 40 years and shows that, among other things, teachers are reluctant to hand over the assessment of pupils to an algorithm; they prefer to monitor pupils’ progress themselves, especially when it comes to pupils with higher needs. A further aspect is that collaboration in the classroom is made more difficult if each student follows an individual AI-supported plan (Modén, 2020). There is no robust evidence regarding the AI tools currently available on the education market that suggests that they improve either student learning or teachers’ work situation (Holmes, 2023).

¹¹ Studies of control and communication in living beings and machines.

¹² The new rules set out certain obligations for AI providers and regulate the authorisation of AI systems in the EU single market. “For certain uses of artificial intelligence, the risks are deemed unacceptable. These systems will be banned in the EU. These include cognitive behavioural manipulation, predictive policing, emotional recognition in the workplace and educational institutions, and social scoring. Remote biometric identification systems such as facial recognition will also be banned, with some limited exceptions” (European Council, 2024).

¹³ Adaptive computer-assisted learning is where, through machine learning, the computer programme learns to recognise the types of tasks that the student can do and adjusts the level of difficulty accordingly. The teacher can monitor the work of individual students and get information on how many tasks they have successfully solved and how many tasks they have completed. The teacher can then get class-level statistics and discover what students are struggling with.

How far has the education sector come with AI?

From autumn 2024, upper secondary schools and education providers within adult education will be able to offer the subject Artificial Intelligence. The subject will primarily focus on AI development from a societal perspective but will also give students opportunities to learn how to use AI for problem solving (Skolverket, 2023). Of course, this raises questions about what kind of tools students will need. Both legal and ethical issues will need to be addressed.

Results

This section presents the results of the survey. Some differences between pre-school teachers and teachers in different school types can be discerned.¹⁴ There are also some tendencies towards differences depending on the age or gender of the teacher. Differences of this kind are commented on throughout the report.

Digital learning tools and artificial intelligence in education

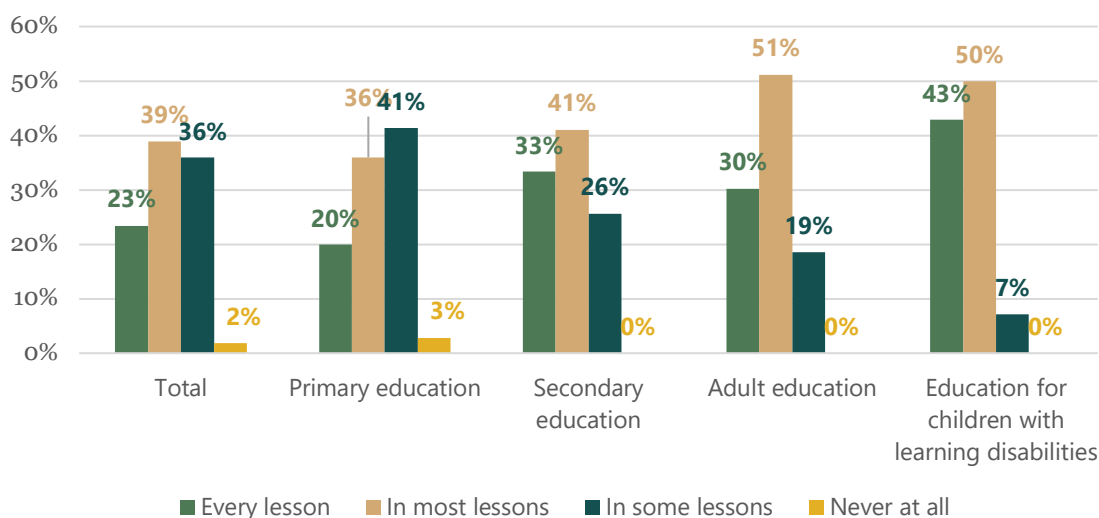
What is clearest from the survey is that pre-school teacher and teachers often use digital learning tools in their teaching (Figures 1-3), while they are less likely to use AI (Figures 9-10). This is an expected result, given that the digitalisation of the school system has been going on for much longer than the time AI tools have been available. Using digital learning tools in education seems to be an undeniable part of many pre-school teachers' and teachers' daily lives, so it may be more interesting to look at what digital learning tools are used for than whether they are used (Figures 4-5).

Digital learning tools – part of everyday life

Teachers use digital learning tools to a relatively high extent in all school types. In primary, secondary, adult education and specialised school types, 62 per cent state that they use digital learning tools every lesson or in most lessons (Figure 1). Only two per cent say they never use digital learning tools. Teachers in specialised education are the most likely to report using digital learning tools every lesson or in most lessons (93 %). All of those who say they never use digital learning tools are in primary education, and most of these work as special needs teachers.

Figure 1. How often do you use digital learning tools in your teaching?

(As shown below Total, Primary education, Secondary education, Adult education, Ed. for children with learning disabilities)

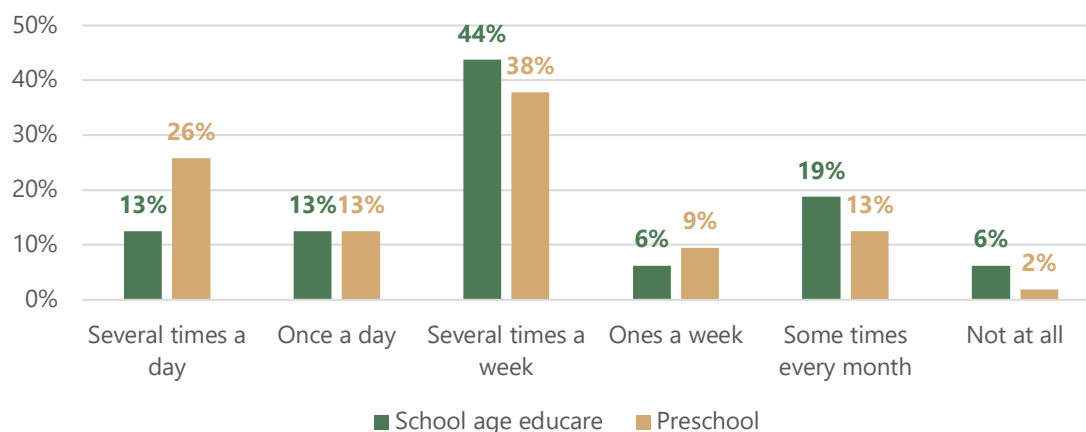


¹⁴ The text will mention both pre-school teachers and teachers. In some cases, only teachers are mentioned for editorial reasons. Teachers include teachers in pre-school classes, school age educare, primary schools, upper secondary schools, education for children with learning disabilities and adult education. Special needs teachers and special pedagogues are also included in the survey.

Teachers in school age educare and pre-school teachers were given different response options than others as the term “lesson” is not used in these activities.¹⁵ The proportion who responded that they use digital learning tools several times a day and once a day among teachers in school age educare is 26 percent (Figure 2) and in preschools 39 percent (Figure 3). However, it should be noted that this is a low response rate for teachers in school age educare and therefore these results should be interpreted with great caution.

Figure 2 and 3 combined. How often do you use digital learning tools in your teaching?

(Chart 2: School age educare, Chart 3: Preschool)



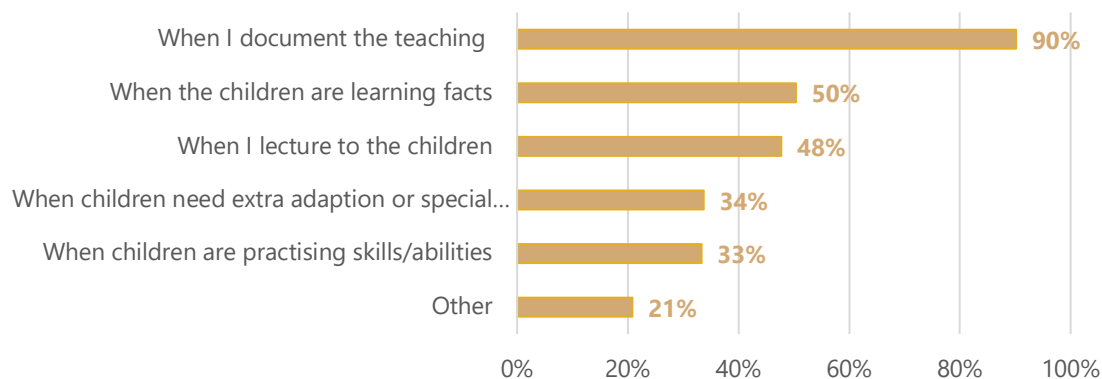
Digital learning tools are used when they fulfil a function

Preschool

In preschool, digital learning tools are most used when pre-school teachers need to document their teaching (90 per cent), while pre-school teachers use digital learning tools to the lowest extent for the purpose of children practising skills/abilities (33 per cent, Figure 4).

Figure 4. For what type of activities do you use digital learning tools?

(Preschool)



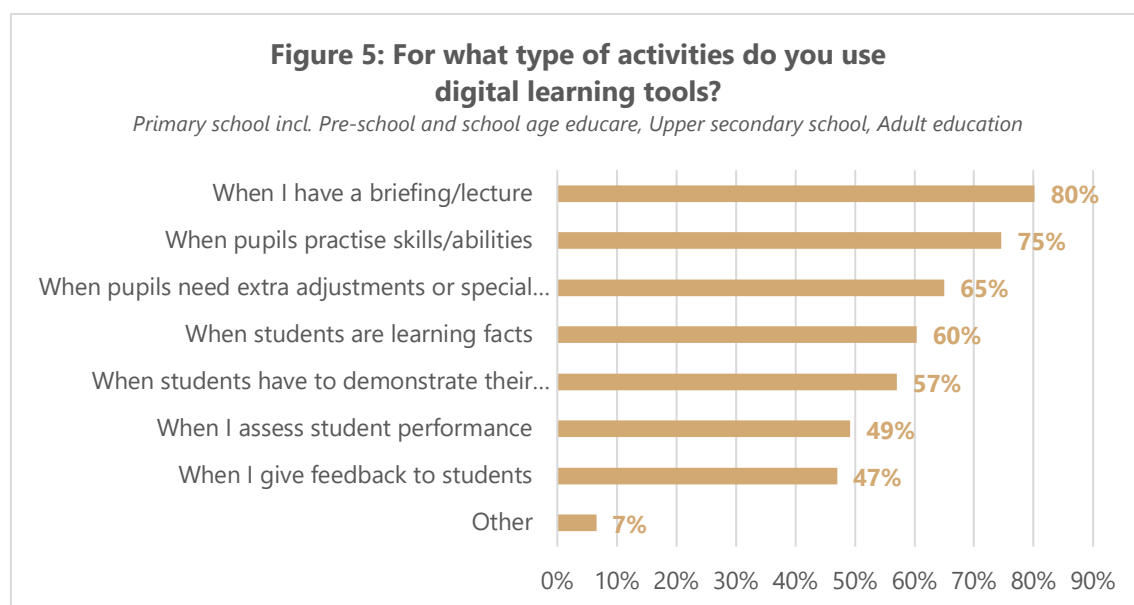
¹⁵ However, teachers in after-school centres may have a dual role and teach subjects during the compulsory part of the school day; for practical reasons, all teachers in after-school centres were given the same response option.

A fairly large proportion of pre-school teachers (21 per cent, Figure 4) selected the option ‘other’, and of these, many chose to give examples in free text. These responses are summarised in Table 1 below.

Table 1: Examples of learning activities where digital learning tools are used in preschool

	Category
Digital eggs, projector, factual films via QR code, digital library, digital music forum, Scan QR codes, films, and songs	Instruction/walk-through by pre-school teachers
Dance, yoga, gymnastics, movement, children documenting their constructions, searching for information on websites, creating their own music, drawing on their own photos, filming, searching for and discussing images, reflecting on activities with the children, language and creativity, programming, creating through green-screen.	Children’s activities
For training purposes together with other pre-school teachers, supervise colleagues	Collegial learning
Creating environments, quiet time with seascapes, listening to music, inspiring creativity, enriching learning environments, building play/learning environments, finding current research, getting ideas and tips, interactive games, motion videos, digital backdrops for play	Inspiration/experiences
Music from Youtube, listening to books in your home language, Polyglutt, Educational Radio	Children watching or listening
Log in/out children, Schedule management	Administration
Documenting learning and development, Documentation through photography	Documentation of learning/assessment

Teachers indicate to the highest extent (Figure 5) that they use digital learning tools when I have a review/lecture myself (80 per cent) and when students are practising skills/abilities (75 per cent). Teachers are less likely to use digital learning tools when assessing student performance (49 per cent) or when providing feedback to students (47 per cent). The pattern is similar regardless of the type of school/activity; however, in after-school centres and pre-school classes, only one (1) pre-school class teacher indicated that they use digital learning tools for feedback/assessment (Figure 5). The fact that assessment of pupils’ results does not occur in school age educare or in pre-school classes is otherwise expected.



Several teachers have chosen to give examples under the heading Other. Many of the examples could be categorised under one of the original options but this gives a clearer picture of what is actually happening in classrooms when reading the free responses, although the list of examples is hardly complete (Tables 2-4).

Table 2: Examples of learning activities using digital learning tools in primary and lower secondary schools	Category
Powerpoint, Wordwall, apps in Ipad, To vary the teaching with modal tools	Instruction/briefing by teachers
Programming, Swedish and maths games on Schoolplus, Pupils' workbook where they write, listen and more, ready-made exercises, e.g. Escape Room, My first app where pupils can record 'words' and listen to themselves after a period of practice, logbook in OneNote, writing tools, practising/listening to vocabulary, writing projects, Quantity training, skills training	Student activities
Station work, Legilex, games to practise skills,	Adaptations/Specialised support
Search for inspirational images	Inspiration/experiences
Watching films, watching films to create a pre-understanding in the mother tongue, Instructional films, films in modern languages	Children watching or listening
Pupils receive information via teams, weekly newsletters, documentation, distance learning	Communication
Digiexam, assessment support, documentation of work in crafts, assignments and writing tasks, evaluation of pupils' own work, evaluation of my tests and teaching	Documentation of learning/assessment

Table 3: Examples of learning activities using digital learning tools in upper secondary schools and adult education	Category
Tasks requiring digital tools, practical exercises, laboratory work	Student activities
Posting extra customised tasks, extra tasks	Adaptations/Specialised support
Chat with students	Communication
Real-time feedback and feedforward when students are doing an assignment, for example	Documentation of learning/assessment

Table 4: Examples of learning activities using digital learning tools in specialised and adapted schools	Category
The software in SMART board	Instruction/briefing by teachers
Visual aids, clarification, talking devices, big mac, clarifying educational structure, communication, and time aids	Adaptations/ Special support
Sensory experiences	Inspiration/ experiences
Photo documentation to visualise your own learning	Documentation of learning/assessment

Digital learning tools bring both progress and frustration

Increasing accessibility and participation

Pre-school teachers and teachers in all types of schools/organisations see advantages in using digital learning tools in teaching (Figure 6). It is above all in primary and lower secondary schools (73 per cent), upper secondary schools (74 per cent) and adult education (84 per cent) that digital tools help to make teaching more accessible and flexible. Teachers in special needs and special schools (83 per cent) and teachers in pre-school classes (89 per cent) are the most likely to think that it makes it easier to adapt to the individual needs of each child/student (Figure 7). Those who to the lowest extent consider that it facilitates planning, preparatory and follow-up work are teachers in school age educare (19 per cent), but as there were few respondents in this category, the results should be interpreted with caution.

Figure 6. What advantages do you see in using digital learning tools in your teaching?

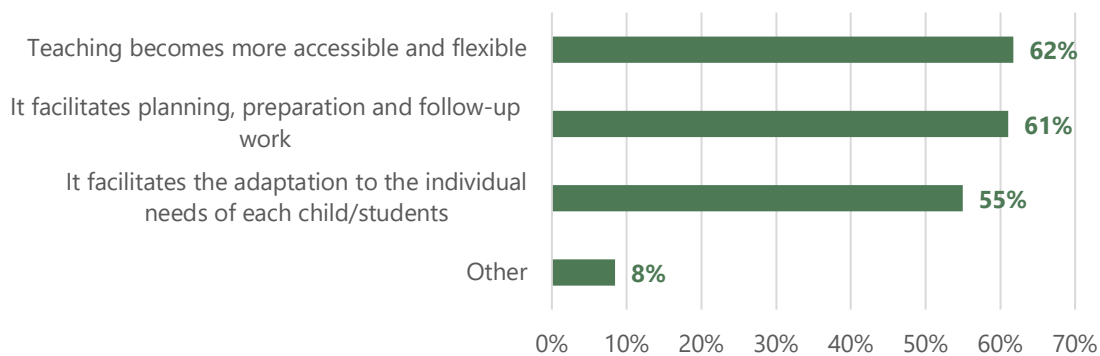
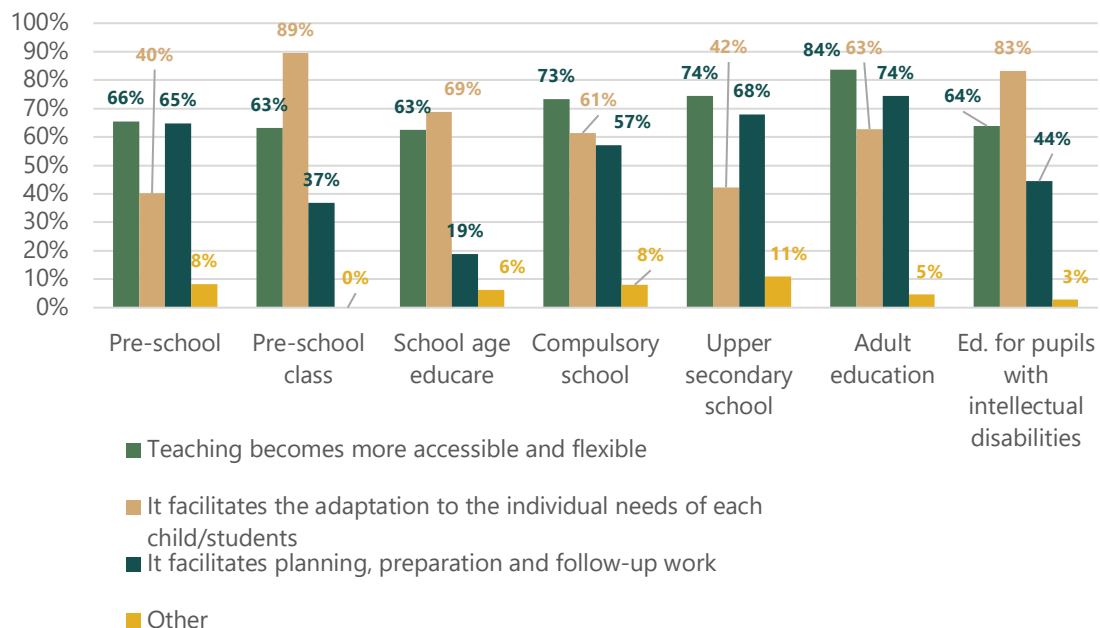


Figure 7. What advantages do you see in using digital learning tools in your teaching? – Divided by school form



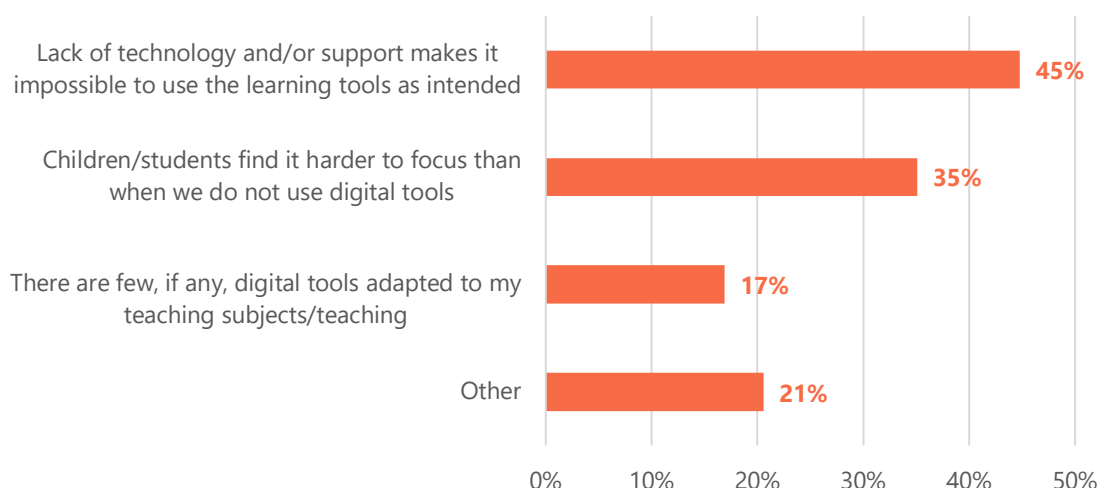
Pre-school teachers and teachers were given the opportunity to give examples of what they meant if they had given the option 'other' and many chose to elaborate in free text. The examples teachers and teachers give as benefits of digital learning tools can be summarised as relating to the following areas:

- Accessibility
- Participation and Child/Pupil Activity
- Customisation, training, and practice
- Saving time
- Administration and documentation
- Flexibility
- Concretisation and Exemplification
- Inspiration
- Planning and evaluation

Technical glitches and distractions

A lack of technology and/or support that prevents the learning tools that the pre-schoolteacher or teacher wants to use in their teaching from working as intended is the main disadvantage of digital learning tools for the group as a whole (Figure 8).

Figure 8: What disadvantages do you see in using digital learning tools in your teaching?



All learning tools require thoughtful use

Most free text examples of what they mean by 'other' are that students who have access to their own device (computer or tablet) often use it for non-school work during class time, especially if there is an internet connection. What teachers describe is that this means that they must set aside time to monitor that students are doing the right things.

Several comments refer to the idea that children and pupils, especially the younger ones, get too much screen time outside the preschool/school, which is why they want to minimise their use in the classroom. Teachers and teachers feel that children and pupils are almost addicted to mobile phones, computers or tablets and do not want to be without them.

Many pre-school teachers and teachers also highlight the fact that practising certain skills and abilities requires the use of analogue tools; practical elements cannot be done digitally, but it is also highlighted that literacy training can be better if done in analogue. Other examples of disadvantages are that children and pupils are sometimes not interested in using digital learning tools.

In school, some pupils are not able to use the tools as intended and pupils forget to bring their computer or tablet to class, which happens relatively often.

A critical approach is not the same as being reactionary

Among those who give examples of disadvantages of digital tools in free text, many express that they are basically in favour of using digital learning tools and that they see it as an opportunity for varied teaching. This does not mean that these pre-school teachers or teachers are uncritical, several respondents highlight some of the examples above but also point out that they also see advantages.

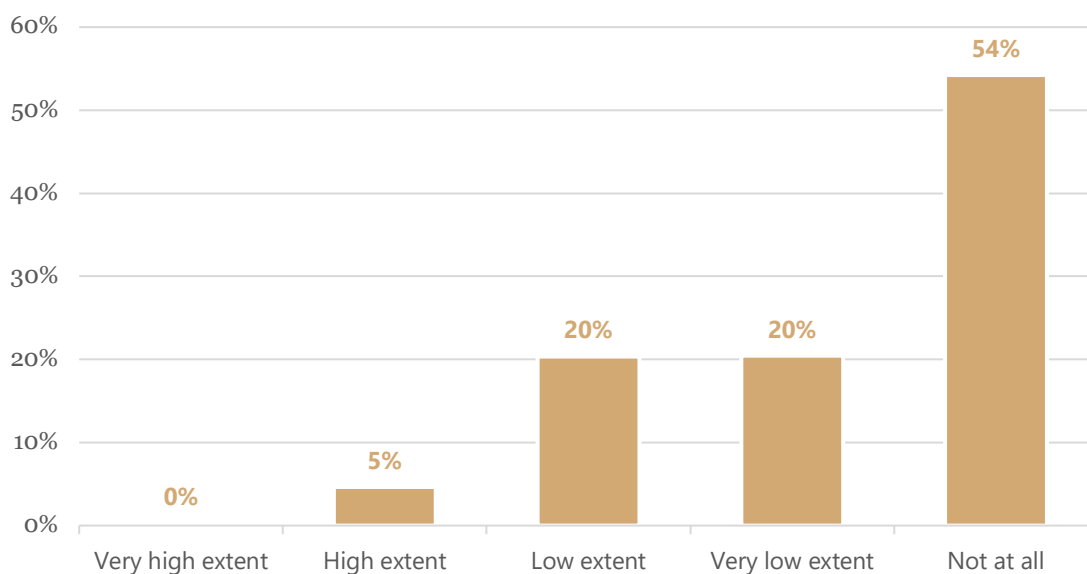
Those who are basically in favour of digital learning tools say that school management and principals are not responsive to teachers' wishes about what digital learning tools they need, and that the school's finances do not allow them to update or invest to the desired extent, as examples of drawbacks. Some highlight that it is problematic that they are referred to use free tools that are not quality assured or other applications that are not really intended for school teaching.

AI still has no obvious place in education

Most of the pre-school teachers and teachers who participated in the survey say that they do not use AI in their teaching at all (Figure 9). Only three teachers responded that they use AI to a very high extent. The fact that very few use AI in teaching is hardly surprising, as the technology has been available for a relatively short time and AI tools adapted for teaching are not yet widely available.

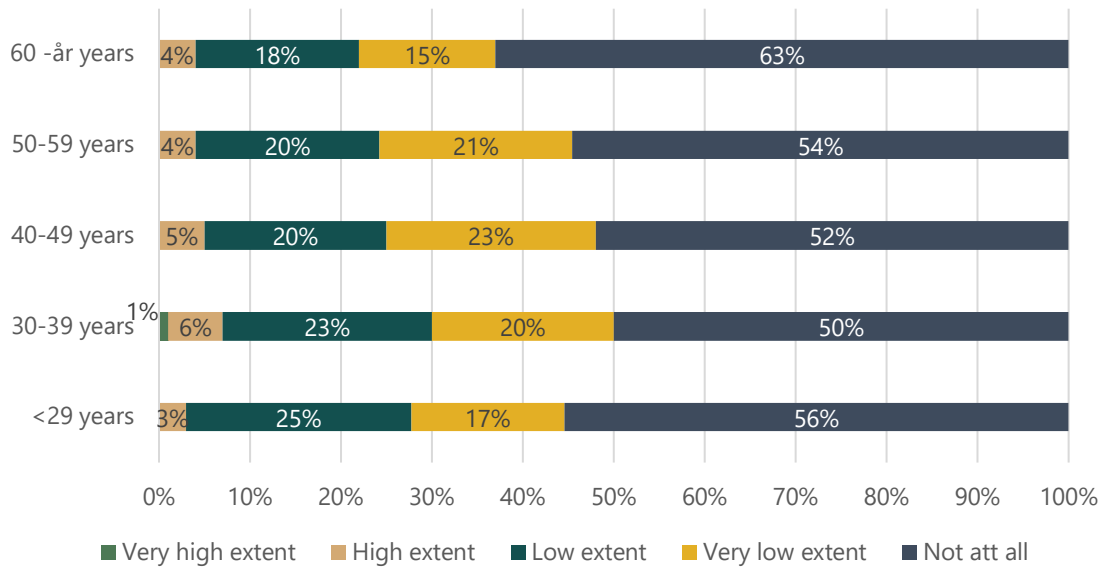
A larger proportion of teachers and teachers in the younger age groups have responded that they use AI in their teaching more often than in the older age groups (Figure 10). Men are slightly more likely to respond (6 per cent) than women (4 per cent) that they use AI to a great extent in their teaching. According to the survey, those who use AI most often in their teaching are those in secondary schools.¹⁶

Figure 9. To what extent do you use AI in your teaching?



¹⁶ 11 percent of secondary school teachers indicate that they use AI to a very high or high extent.

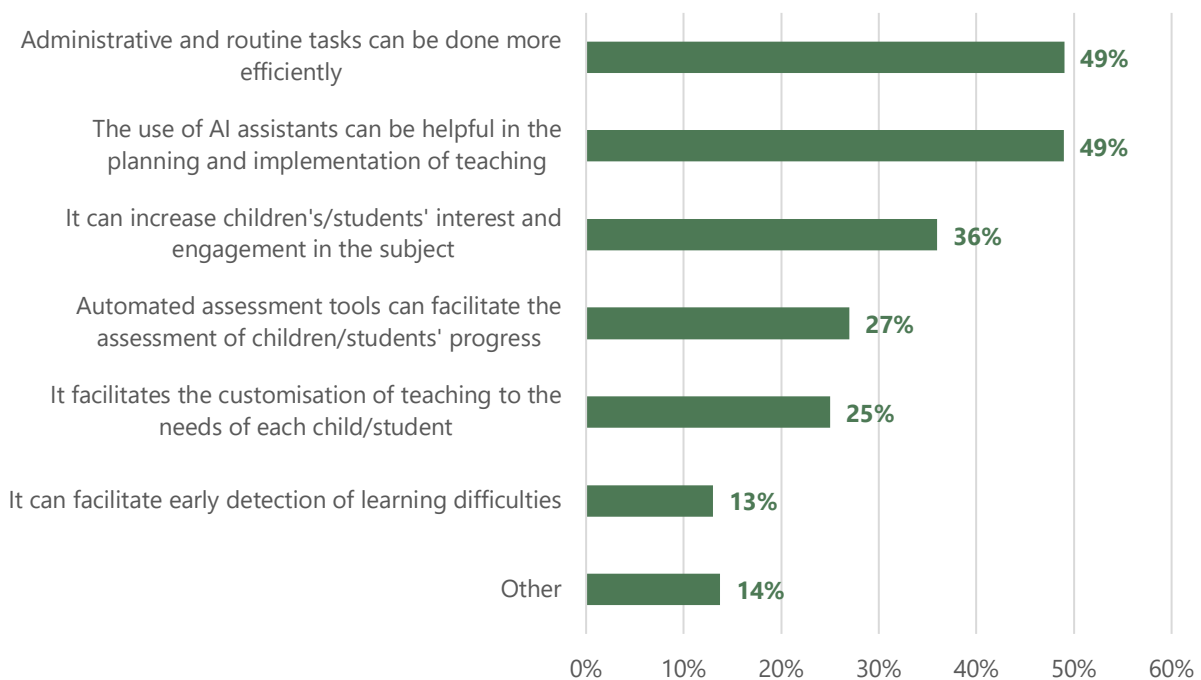
Figure 10. To what extent do you use AI in your teaching? – By age group



Note: Almost nobody answered, "To a very large extent", therefore most bars with that answer are missing.

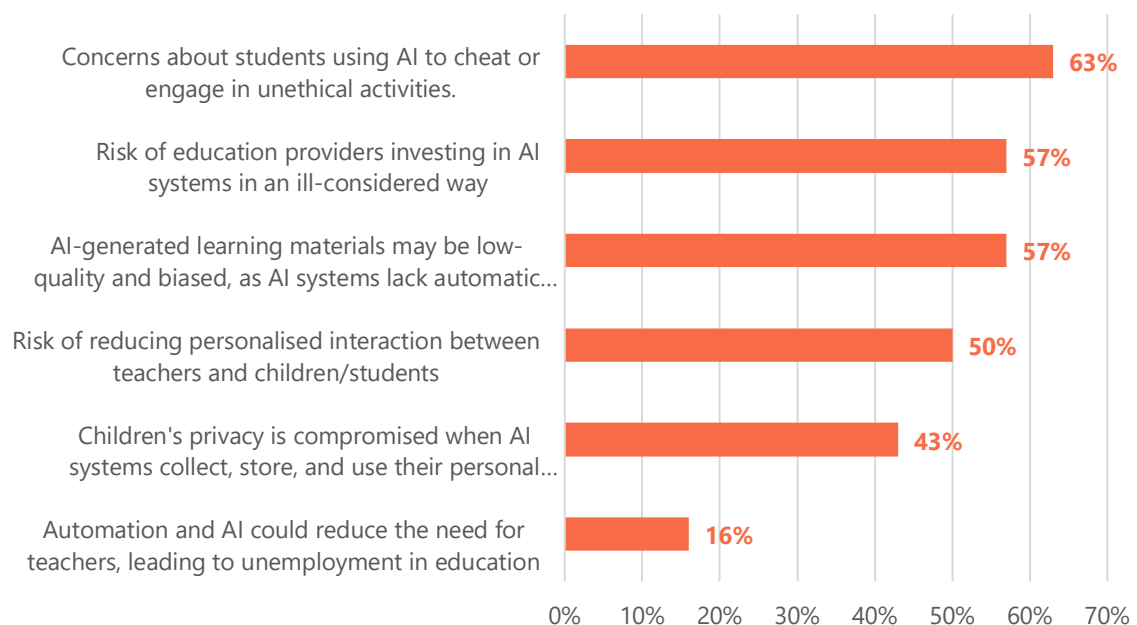
When pre-school teachers and teachers respond to the benefits, they see in using AI in teaching, administrative tasks can be streamlined and that it can help with planning and implementation top the list (Figure 11). Fewer believe that AI would be an advantage in assessing children's/pupils' development or that it could make it easier to adapt to their individual needs. 14 per cent see benefits other than those listed in the response options, which is one percentage point more than those who responded that AI could facilitate early detection of learning difficulties.

Figure 11. What possible benefits do you see related to AI in education?



At the top of the list of potential drawbacks of AI in education is the concern that students will use the technology to cheat on schoolwork or for other unethical activities (Figure 12). Given that there are readily available AI tools that can, for example, produce text or edit images in a very short time, this concern is probably justified. There are those who worry that the development of AI could eventually lead to unemployment in the education sector, but this is the area of least concern. Pre-school teachers and teachers are more concerned about education providers investing in AI tools without thinking it through first, and that AI-generated learning materials may be of insufficient quality.

Figure 12. What possible disadvantages do you see related to AI in education?



Preschool teachers', teachers', and students' self-assessed AI competence is low

21 per cent of respondents estimate that they themselves have very good or good knowledge of AI. Almost twice as many (39 per cent) states that they have some knowledge in the area and the same proportion believe that their AI knowledge is less good or that they have no knowledge at all (Figure 13). Although it is of course possible to interpret the options in different ways, it can nevertheless be concluded that only a minority seem to consider themselves knowledgeable in the field. How pre-school teachers and teachers estimate their own knowledge in AI areas is linked to their age and gender. Younger people are more likely to consider themselves to have very good or good knowledge than older people. Men are more likely to rate their knowledge as very good or good than women (Figure 13).

When they instead estimate students'¹⁷ knowledge, it appears at first glance that they judge students' AI knowledge to be lower than their own (Figure 14). This somewhat contradicts the common perception that those who grew up in the age of digitalisation are more knowledgeable than those belonging to older generations. However, it must be considered that 18 per cent of teachers say they do not know what their students' AI skills are.

¹⁷ Pre-school teachers did not answer the question about children's AI skills.

Figure 13. How would you rate your own knowledge of artificial intelligence (AI)?

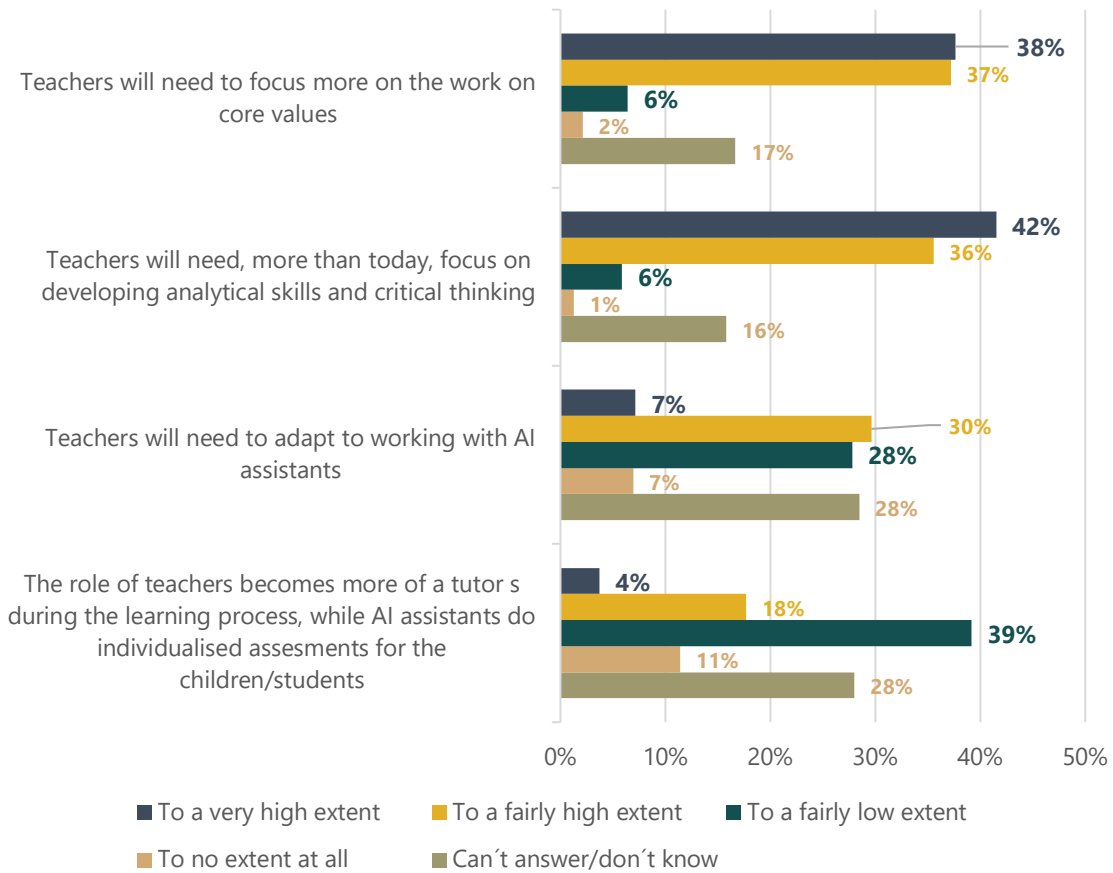


Figure 14. How would you rate your students' knowledge of artificial intelligence (AI)?



The fact that pre-school teachers and teachers will need to focus more on working with core values and have an increased focus on developing children's and pupils' analytical skills and critical thinking is what respondents believe will be the biggest impact on teachers' roles and tasks due to AI developments (Figure 15). Relatively many (37%) believe that teachers will have to adapt to collaborating with AI assistants, but fewer (22%) believe that AI assistants will take over the design of personalised tasks for children and students, while teachers will take on the role of tutors instead. At the same time, these are the two areas where most people say they are unsure whether the role of teachers might change in this direction (28 per cent answered don't know to both questions).

Figure 15. To what extent do you think the mission and role of teachers will change due to the development of AI?



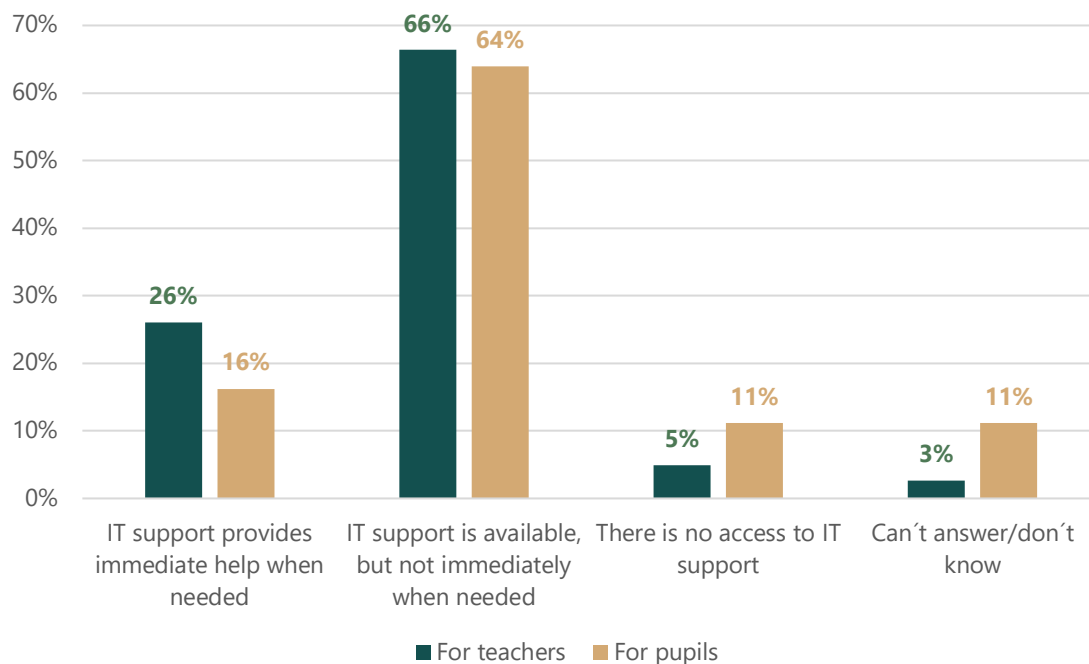
The current digital situation of organisations

Swedish society is now digitised to such an extent that it is natural for digital systems and tools to be found in the education system. As we have shown above, pre-school teachers and teachers use digital learning tools in their teaching to a relatively high extent. In the survey, we have therefore sought answers to what the digital infrastructure looks like in the organisations and how it is linked to teachers' influence over digital resources and work environment.

Digital infrastructure and empowerment

26 per cent of respondents answered that they receive help from IT support immediately when needed (slide 16). When the same question was asked by the former Teachers' Union in the autumn of 2020, the proportion of respondents who said that IT support provided immediate help was the same. The proportion who then stated that there was no IT support at all was slightly higher than in the current survey, 6 per cent (Läraryrbundet, 2021). As far as pupils' access to IT support is concerned, it seems to be worse than that of teachers, or alternatively that the extent to which pupils have access to IT support is not known.

Figure 16. How is access to IT support at your workplace?



42 per cent state that access to pedagogical support in terms of digital tools is very high or quite high (Figure 17). This is a deterioration compared with the responses teachers gave in Lärarförbundet's 2020 survey, when the corresponding proportion was 56 per cent (Lärarförbundet, 2021).

One explanation for this could be that recent cuts in the school system have meant that these types of services¹⁸ have been reduced in scope or removed entirely from schools. Although most pre-school teachers and teachers (69 per cent) say they have very high or fairly high access to the digital tools they need for teaching, almost one in three (31 per cent) say that access is not satisfactory. teachers and teachers' ability to influence which digital tools to use is higher (50 per cent very high or fairly high) when it comes to what they use in their teaching than when it comes to digital tools in general in their workplace (31 per cent).

Digital work environment

Based on the survey results, employers in the school system appear to be poor at following up the digital work environment as part of systematic work environment management. If such work is done at all, it seems to be unknown to at least most teachers (Figure 18).

¹⁸ ICT educator, ICT coordinator, lead teacher with ICT responsibilities or similar.

Figure 17. To what extent do you have...

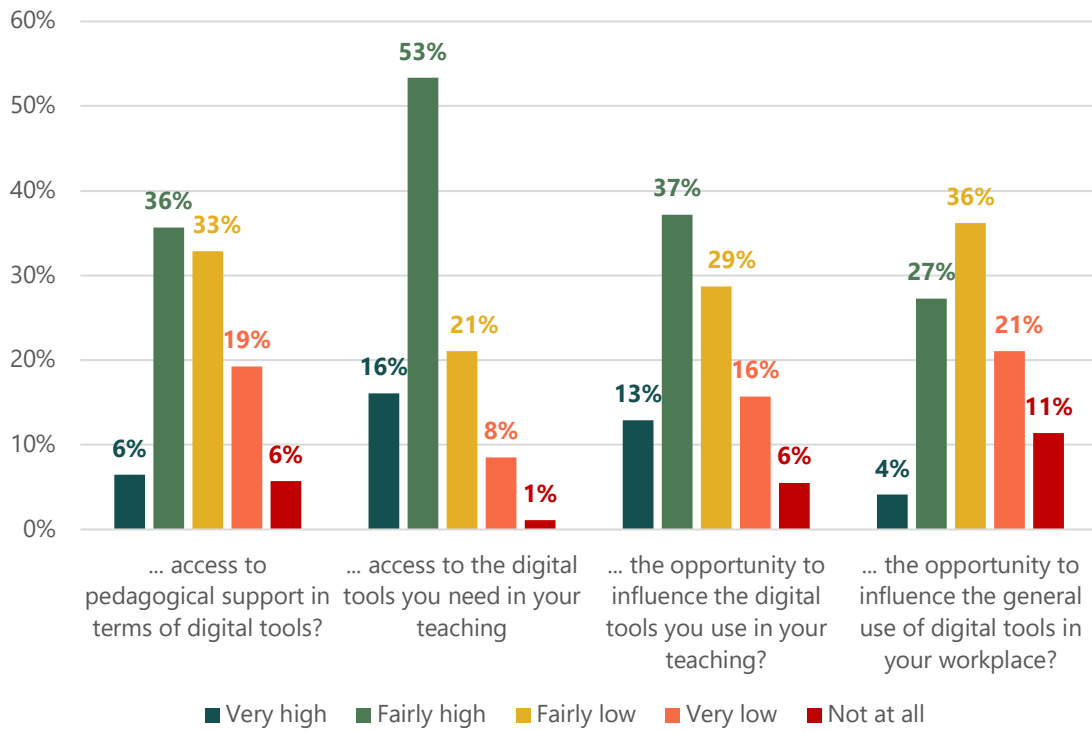
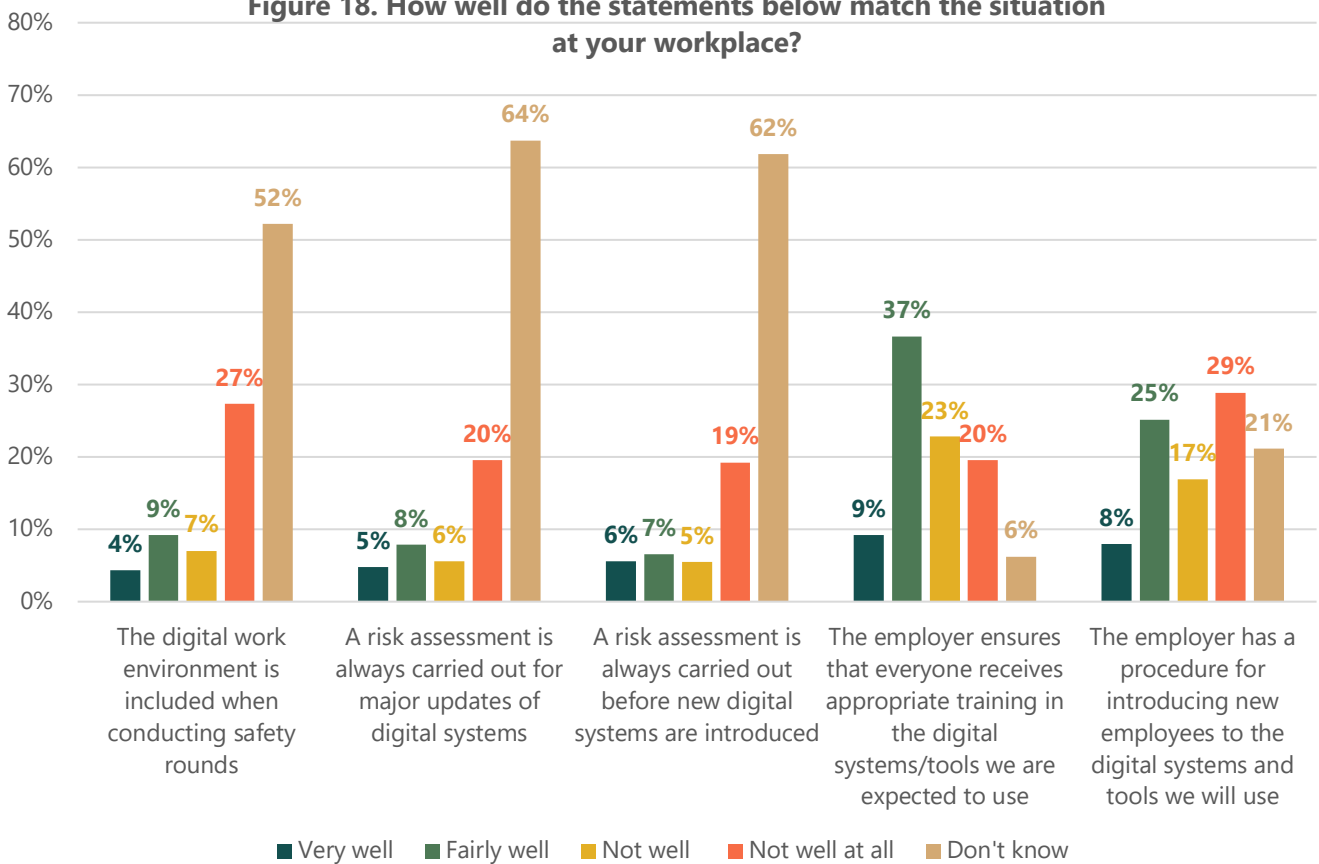


Figure 18. How well do the statements below match the situation at your workplace?



Few teachers say that the statement “the digital work environment is included when conducting safety rounds” match the situation at their workplace *very well* (4 per cent) or that risk assessments are carried out before updating digital systems (5 per cent) or when new systems are introduced (6 per cent). Almost half of teachers (43%) say that their employer does not ensure that staff receive appropriate training on the systems or tools used in the workplace, and even more (46%) say that their employer has no procedures for introducing new employees to the organisation’s digital environment. One in five teachers (21%) say they do not know whether their employer has a procedure for introducing new employees.

Given the rapid pace of AI development and the many stakeholders interested in bringing AI into the world of preschools and schools in various ways, it would be reasonable for this to be a topic of discussion among colleagues in the various organisations. The survey shows that just under half (48 per cent) of teachers have had discussions about AI development in their workplace.

Of those who responded that they have discussed AI in the college, it is most common for the issue to be discussed spontaneously in the staff room/equivalent in connection with breaks (65 per cent), so it is conceivable that there is a need to discuss AI, but that it usually takes place in less organised forums (Figure 19). It also seems to be somewhat more common for teachers to discuss the issue within the framework of cooperation in subject groups or work teams than for the school management to have raised it in connection with operational planning or work environment management. At the same time, there are examples of the issue being discussed as part of the collaboration work, as 46 per cent respond that AI has been an item at the workplace meeting or equivalent.

Figure 19: Those who answered yes have discussed AI in the college as follows:

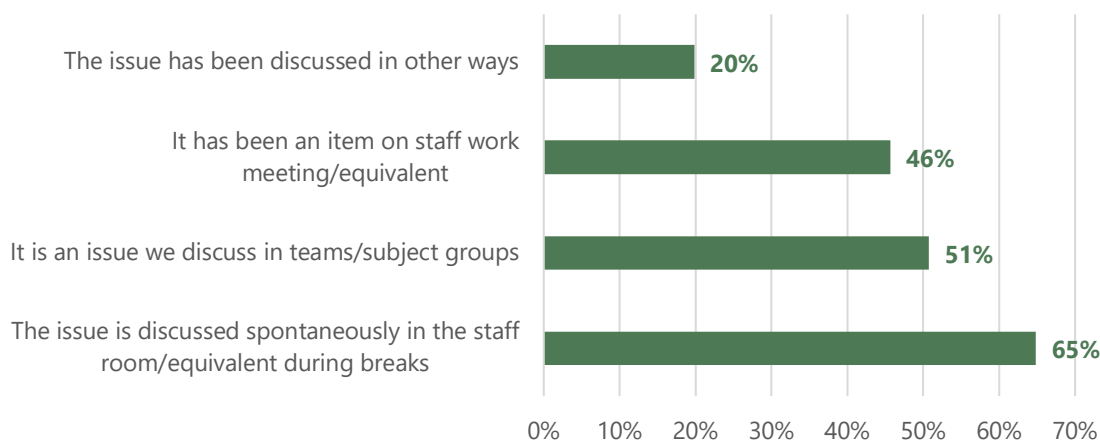
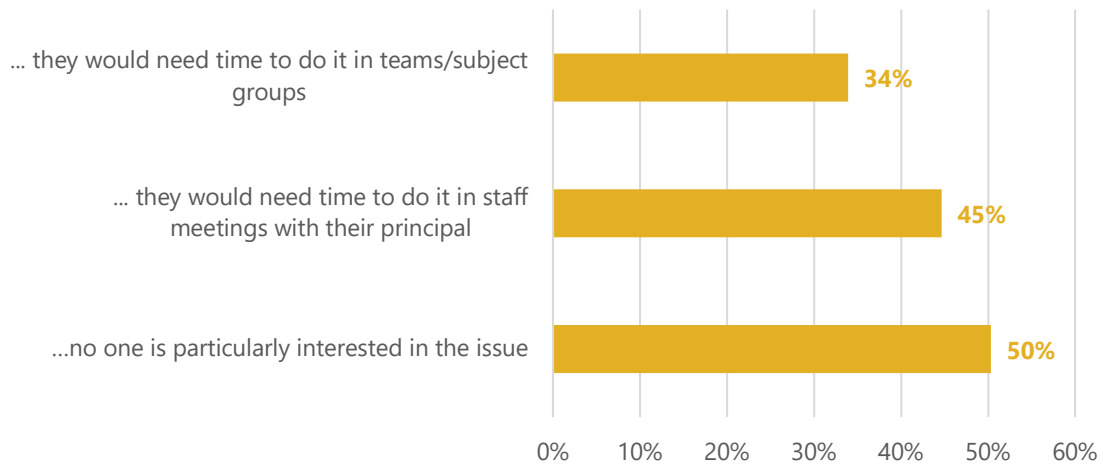


Figure 20: Those who answered no consider that ...



Of those who responded that they have not discussed AI in the college, a majority state that no one is particularly interested in the issue in the workplace, so the lack of AI discussion is not so surprising (Figure 20). At the same time, it is probably also a sign that neither principals nor school leaders are likely to have initiated conversations about AI as a work environment and cooperation issue, something employers should reasonably do regardless of whether teachers express interest for the subject or not. In this group, somewhat more people state that they believe the staff should have time to discuss this within their work team or subject group than those who express a need to have time to discuss AI at staff meetings. This can be interpreted as teachers viewing AI in teaching more as a pedagogical or didactic issue rather than as a labour rights and work environment issue. This can be interpreted as teachers seeing AI in teaching as a pedagogical or didactic issue rather than as an issue relating to labour law and the working environment.

Conclusions and requirements

Teachers use digital tools professionally – when possible

Teachers are competent to decide which learning tools to use, when and for what. From the survey responses, it appears that teachers across the school system weigh the pros and cons before choosing to use digital learning tools. It also appears that pre-school teachers and teachers are open about the areas in which they feel less knowledgeable, such as the technology of Artificial Intelligence, and that in these cases they request appropriate professional development.

However, there are several circumstances that prevent pre-school teachers and teachers from acting on their professional judgements when it comes to using digital learning tools in teaching. The experience of how principals and school leaders made some ill-considered investments at the beginning of the digitalisation of the school system is still in the collective memory. Teachers are still affected by these decisions, even if the 'IT zeal' seems to have subsided somewhat, and the pendulum even seems to be swinging in the opposite direction, at least politically. Investments in learning management systems, procurement of digital learning materials that may not suit everyone are still part of everyday life. In many places, perhaps especially in primary and secondary schools, the units' IT budgets have increased enormously.

The fact that most respondents in the survey say they are concerned that education providers are making ill-considered investments when it comes to AI is not particularly surprising against this background.

Not being able to opt out of digital learning tools can be one problem. Experiencing shortcomings with the learning tools pre-school teachers and teachers want to use is another – and according to the survey – a bigger problem. Hardware and equipment that breaks or becomes obsolete is not repaired or replaced, technical support is available in most places, but pre-school teachers and teachers rarely get help directly when needed. Opportunities for learners in schools, colleges, and adult education to get support are limited. Pedagogical support in working with digital learning tools has decreased since the last survey (Lärarförbundet, 2020).

The generally high workload of teachers and teachers also means that the time for necessary collegial dialogue, planning and reflection is very limited.

A wide range of digital learning tools are used in pre-school and school

In the debate of the last year, it has sounded as if there are only two alternative learning tools in preschools and schools: paper or screen. As this is a report on pre-school teachers' and teachers' preconceptions and attitudes to digital learning tools and AI, the text will not delve into the view of analogue learning materials. But let us nevertheless state the following: Pre-school teachers and teachers also want to use analogue learning tools; according to most, using printed books is preferable in many contexts and children and students need access to pens, paper and a variety of other equipment and materials if they are to achieve the goals of the curricula. The teaching community thinks in terms of both/and rather than either/or.

What becomes clear in the study is the variety of digital learning tools used and how teachers use them. Digital learning tools are used to instruct, inspire, plan, document, evaluate, activate and in several other contexts. The media image of children sitting alone with a tablet is a very distorted picture of how teachers work with digital learning tools in preschool. What pre-school

teachers do is to use technology to create backdrops for the play environment, for creative work or to play music for dance and movement and much more.

In schools and adult education, technology can help to implement extra adjustments, increase the accessibility of teaching, and create more flexible solutions.

The digitalization of the school system is hardly problem-free, but it is much more multifaceted than the public debate has made it out to be.

Develop skills first – invest and use later

As mentioned earlier, many pre-school teachers and teachers are worried that principals and school boards will make ill-considered investments when it comes to AI. The message, which is particularly clear in the free text responses, is not to move too fast. The same applies to digital learning tools in general; before investments are made, pre-school teachers and teachers want competence development. Or as one teacher put it in the survey:

“... not implementing new tools just because they are new, or part of a perceived inevitable evolution.”

— Teacher, adult education

An important initiative on the part of the government is training to develop the procurement skills of those responsible for procurement in the municipalities. Similar support measures should be provided to individual principals. Procurement expertise regarding digital tools in the school system must include knowledge of the requirements of the Education Act on learning materials and learning tools. The Government should consider setting up a national procurement support centre that can also carry out coordinated procurements.

AI is knocking on the door but has not yet been let into the learning environment

AI is used to a very limited extent in the education system today. This is probably due to a combination of the fact that pre-school teachers and teachers do not yet consider their skills to be sufficiently good to use AI and that the range of AI tools adapted to teaching is limited. It may be that students, especially at higher ages, are using AI in their schoolwork.

to a much greater extent than teachers do in class. Tools such as ChatGPT have opened new opportunities for shortcuts, and teachers report that they are increasingly allowing students to complete assignments away from the classroom. The fact that AI can be used to cheat on school assignments may contribute to the scepticism of pre-school teachers and teachers towards the technology.

The areas in which pre-school teachers and teachers believe that AI will be useful are primarily administration, where they envisage that AI could facilitate the performance of routine tasks. Another area where AI could contribute is in the planning of teaching, where teachers believe that AI assistants could fulfil a function. Here it should be borne in mind that teachers estimate their own level of expertise in AI to be quite low, which is why their views on both advantages and disadvantages may change as they acquire more knowledge in the field.

Pre-school teachers and teachers see it as a possible development, if AI is introduced into the school system, that teaching will need to focus more on core values, source criticism and

analytical thinking than today. The more social aspects of education and human interaction can never be replaced by technology, they say.

Many of the teachers emphasise that they want competence development on AI as well as opportunities to discuss and reflect together as a team before they want to start using the technology in teaching.

“Because of our ignorance of the subject, AI feels very threatening. We need more information on the subject so that we feel safe and can make good use of AI.”

— Teacher, primary school

Hurry up slowly!

A clear message from pre-school teachers and teachers to politicians, education providers, principals and school leaders is that the introduction of AI in education, if it is to be introduced, should be done in a thoughtful way and that it must therefore be allowed to take time. Education and learning are processes that work perfectly well to be carried out completely analogue, which is why there is no rush to introduce new technology. Rather, it is seen as beneficial to let it take time and wait for AI tools developed by professional pre-school teachers and teachers in collaboration with both researchers in educational research and engineers to become available on the market. Above all, the teaching profession needs time to analyse together the needs and reflect on the pros and cons of AI in education in both the short and long term.

The last thing you want to see is a repeat of the less well-thought-out processes experienced during the early IT initiatives in the school system.

“The digitalisation of schools and society has gone too fast. It’s hard to regain lost ground, for example in terms of children sitting still in front of screens and using social media in a way they are not ready for. I hope we don’t make the same mistake with AI. Hurry up slowly!”

— Teacher, primary school

The state must contribute with more coordination and governance

According to the new definition of learning materials and learning tools in the Education Act, a learning material is “a printed or digital work, in whole or in part, which is intended to be used in teaching, which is consistent with the relevant parts of the applicable course, subject or subject area syllabus and the curriculum, and which is published by someone who conducts publishing activities of a professional nature.” (SFS 2010:800)

There are currently no AI tools developed for teaching in accordance with Swedish curricula. This means that, yet there are no AI tools that fulfil the requirements of the Education Act for teaching materials. Of course, there is nothing to prevent pre-school teachers and teachers from testing different AI tools, themselves or together with children and students. However, replacing other learning materials with AI is, so far, not compatible with the requirements of the Education Act on pupils’ right to learning materials.

The government should therefore urgently appoint a broad commission to produce a research review on the use of digital learning tools and artificial intelligence in education and on this basis, in co-operation with representatives of the profession, develop national guidelines.

Efficiency improvement must not cost more than it's worth

We are in a situation where it is important to ensure that AI development does not lead to ill-considered investments that in turn create displacement effects in other areas. The school system is currently underfunded, which is why new investments are not possible unless more funds are brought into the system. There is also a real risk that education providers will draw the wrong conclusion that the use of AI tools means that operations can be streamlined in such a way that the investments pay off at some other end. The digitalisation of society has made many parts of the education system and the rest of the labour market more efficient, but it has also increased costs. A similar development in terms of AI tools is therefore likely.

The digital work environment is not managed within the framework of the systematic work environment management

It is clear from the survey that the digital work environment is not included in the organisations' systematic work environment management – and if it is the case that, for example, digital safety rounds and/or risk assessments are carried out when new systems are introduced – there is a serious lack of communication as it is not something that pre-school teachers or teachers are aware of.

The digital environment affects the work environment and workload of pre-school teachers and teachers, which is why it is remarkable that so few employers follow up on this within the framework of systematic work environment management. Technology that does not work properly, lack of both technical and pedagogical support creates stress and forces teachers to have several alternative plans for their teaching. A further stress factor is not receiving sufficient introduction to the digital tools that teachers are expected to use.

Education providers and principals must, to a greater extent than today, ensure that risk and impact analyses are carried out at local level when introducing and/or revising digital learning tools, including AI tools, in the school system. The digital work environment must be part of the systematic work environment work and pre-school teachers and teachers must be given real opportunities to participate in collaboration in this area.

Digital tools are collaborated to a low extent

Almost half of the respondents said they had not discussed AI at all in the workplace. Of those who have had such discussions in the workplace, it is more common for the issue to be raised spontaneously in the break room than for employers to raise it as an item at a workplace meeting or equivalent.

A prerequisite for good collaboration is that all parties have knowledge and understanding of what is to be collaborated. By providing more skills development on digital learning tools and AI to principals and headteachers as well as teachers, the conditions for greater collaboration and more influence and participation will increase.

Methodology description

This survey is carried out within the framework of the Swedish Teachers' Union Member Panel. The member panel differs from other web panels in several important ways, which increases the quality and representativeness of the data. In addition to this, an additional sample has been selected to enable more in-depth analyses. Below is first a general description of the membership panel. Specific data for this survey are then presented.

Member panel sampling frame and representativeness

The Swedish Teachers' Union Member Panel differs from many other online panels in the following ways.

Firstly, the member panel is not a so-called self-recruiting panel. In a self-recruiting panel, not all persons in the actual sampling frame (the population you want to describe with the survey) have the same probability of being included in the sample – only those who have applied and found the panel's application page are included in the final panel. This may mean that people who actively apply to the panel have certain characteristics that those who do not apply to the panel lack, which may affect the reliability and representativeness of the survey results.

Instead, all members are asked to participate in the recruitment process for the Swedish Teachers' Union Member Panel. This means that all persons in the selection frame (the union's members) initially have the same probability of being included in the panel. There is still a selection problem even with this method of recruitment, as different people may be differently inclined to accept the invitation. However, this problem also existed with the historically common postal survey: some people are more likely to respond than others. The recruitment procedure reduces the bias that arises in a self-recruiting panel by contacting all individuals in the sampling frame with the same request.

Secondly, through its membership register, the Swedish Teachers' Union has full knowledge of the member panel's sampling frame, and more detailed information than, for example, some survey companies with self-recruited panels may have. In addition, the data can be linked to certain public data on schools, teachers, and pupils in the Swedish National Agency for Education's databases. This means that Swedish Teachers' Union can determine how representative the panel of members is in relation to the sampling frame already when the panel is established. Together with an analysis of the response rates of a specific survey, we can also determine how representative the results are. If necessary, the results can also be weighted.

Third, unbiased random sampling within the member panel is always carried out to minimise the potential impact of the selection problem described above. That is, an individual who has agreed to participate in surveys can never know – or influence – which surveys he or she is invited to participate in.¹⁹

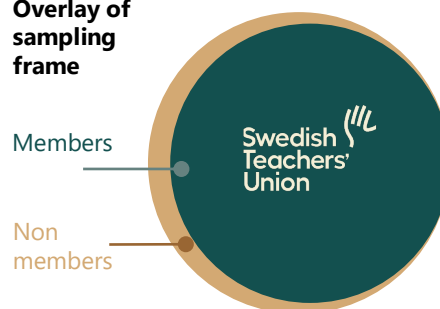
¹⁹ Further reading: Göritz, A. S. & Neumann, B. P. (2016). The longitudinal effects of incentives on response quantity in online panels. *Translational Issues in Psychological Science*, (2) pp.163-173; Martinsson, J. & Andreasson, M. (2013). *Different methods – equal results?* Gothenburg: University of Gothenburg; Wang, W. et al. (2014). Forecasting elections with non-representative polls. *International Journal of Forecasting*, (31) No. 3 pp.980-991; Couper, M. P. (2011). The future of modes of data collection. *Public Opinion Quarterly*, (75) No. 5 pp.889-908; Yeager, D. S. et al. (2011) Comparing the accuracy of rdd telephone surveys and internet surveys conducted with probability and non-probability samples. *Public Opinion Quarterly*, (75) no 4 pp.709-747.

Member panel and national representativeness

The member panel’s sampling frame is the Swedish Teachers’ Union’s members. as not all of Sweden’s teachers and guidance counsellors are members of the Swedish Teachers’ Union, the results of surveys conducted in the member panel cannot automatically be generalised to the country’s entire teaching profession. That said, it is still important to point out that a very large proportion of the country’s authorised and qualified teachers.

Therefore, there is a large overlap between the two sampling frames (see Figure M1), and they are very similar to each other. For example, measures such as mean age and proportion of individuals in independent schools are fully consistent between the two sampling frames.

**Figure M1:
Overlay of
sampling
frame**



Sample and response rate for this survey

The target group for this survey was pre-school teachers, teachers in primary schools, school educare and upper secondary schools and adult education. Teachers in compulsory schools and high schools for pupils with severe intellectual disabilities, special needs teachers and special education teachers were also included in the sample.

The final net sample and response rates are shown in Table M2.

Table M2: sample and response rate	Number	Share
Gross Turnover	3500	100%
Incorrect contact details	16	0,5 %
Not in target group	0	0 %
Net fall	3484	100% (99,5%)
Number of respondents	1034	30 %
Not completed	87	
Response rate calculated on net sample		30%

Data collection

Data collection was carried out between 8 and 22 February 2024.


A total of two reminders were sent.

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²⁰ Names of publications have been translated for clarity. For the original titles, see the Swedish language original report *Läraryrket digitalisering*, available at sverigeslarare.se/undersokningar

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