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# The Potential Impact of Chatgpt as a Technological Innovation on the Pedagogical Culture of Formal Educational Institutions

## Absztrakt

Az elméleti elemző tanulmány a ChatGPT-nek mint innovatív technológiának a formális oktatási intézmények pedagógiai kultúrájára gyakorolt hatását tekinti át. A ChatGPT lehetséges pozitív hatásainak és potenciális kockázatainak az összefoglalására, illetve az intézmények közötti különbségek alapelveire épít. Feltételezi hogy az innovatív technológiára adott intézményi reakció nagyon jó indikátora az oktatási intézmény szervezeti érettségének és aktuális állapotának. Az innovatív technológia pedagógiai kultúrára gyakorolt hatását, illetve az erre adott válaszreakciót öt különböző lehetőség szerint csoportosítja és ezeket röviden elemzi.

*Kulcsszavak:* mesterséges intelligencia, ChatGPT, innovatív technológia, intézményfejlesztés, pedagógiai kultúra

## Abstract

The theoretical analytical study reviews the impact of ChatGPT as an innovative technology on the pedagogical culture of formal educational institutions. It summarizes the possible positive effects and potential risks of ChatGPT and builds on the principle of differences between institutions. It assumes that the institutional response to innovative technology is a very good indicator of the organizational maturity and current state of the educational institution. The impact of innovative technology on pedagogical culture and the response to it are grouped and briefly analyzed according to five different possibilities.

*Keywords:* artificial intelligence, ChatGPT, innovative technology, institutional development, pedagogical culture

## Educational applications of Artificial Intelligence

The application of AI in education has been of increasing interest to the education research and development community and researchers in the field over the past decade (Tahiru, 2021). Analysis of developments in previous years has made it clear that the impact is likely to be modest in the short to medium term, but could be profound in the long term. Initially, it may increase educational inequalities, but over time learning can become more personalised and benefit all students. AI can make a profoundly positive contribution to learning inside and outside school (Reiss, 2021). With the emergence and availability of ChatGPT, the widespread usability of AI, and within it its educational use, has entered a new era. Even without educational experimentation, it has become clear that the application of this innovative technology in the fields of personalised teaching and learning, differentiated feedback and performance assessment can make significant progress in the short term. The ability of AI to adapt to individual learning needs, to provide education tailored to the strengths and weaknesses of students, can be a very significant challenge, and a commensurate opportunity, within educational institutions.

In addition to organic brainstorming by the professional community, more and more official publications have appeared to support practical use. Among these, the educationally relevant parts of the "ChatGPT everything you need" series are worth highlighting. The ongoing methodological publications offer a variety of theoretical and pragmatic solutions for educational experts and teachers. With ChatGPT, educators can create personalised learning experiences, foster creativity and critical thinking, and support language learning and accessibility (HUGGARD, 2023).

AI and ChatGPT can be used to prepare lessons, create assessments, develop learning aids, etc. It can also be used by students as an aid for research and personalised learning in and out of the classroom (SKRABUT, 2023). In addition to its use in teaching methods and learning organisation, we can also find publications that support pseudo-general pedagogical and educational organisation tasks. There are handbooks that present the benefits and limitations of AI in the classroom, time-saving solutions and ethical issues, as well as concrete examples of how AI can be used to improve student outcomes. There is also a (nowadays still niche) publication that aims to support students, rather than teachers, in the practical use of new technology. The book shows how pupils can solve complex tasks. With the help of simple instructions and real-life examples, learners will be able to simplify the path to learning outcomes (FILA, 2023a, FILA 2023b). In addition to the methodological aids, there is also a study book on teaching practice using ChatGPT in more sophisticated teaching strategies. AI can help instructors create materials that support the provision of multiple examples and explanations, the identification of misconceptions, frequent testing, assessment of student performance, and distributed practice (MOLLICK AND MOLLICK, 2023).

The publications that are appearing in parallel with the spread of the technology also show that it is worthwhile to consider and build a sketchy theoretical model of the changes that can be expected from the use of ChatGPT in education, with particular reference to the impact on the pedagogical culture of institutional forms of education.

## **Differences between institutions and the innovation effect**

The importance of the differences between formal educational institutions cannot be overemphasised when talking about changes in educational culture and the use of technological innovations. There are significant differences between internal institutional cultures that determine how technological innovations in education are accepted, applied and valued. No two students are the same, no two classes are the same, no two learning communities are the same, no two teachers are the same, no two school clientele are the same, and therefore no two schools are the same. The impact of technological innovation on general public education or general higher education can only be discussed in a very superficial way, ignoring these differences. Such an approach can at best contain generalisations that are not applicable to specific institutions and may in most cases lead to erroneous conclusions. General, and therefore superficial, approaches reinforce the hype phenomenon and thus put a strain on any realistic prospects for implementing technological innovation. Generalisation also encourages the development and spread of pedagogical myths and misconceptions. This makes it particularly important to take into account differences between institutions when analysing the potential and expected impact of innovative technologies. In most cases, technological innovation emerges not only as a conscious and planned process of implementation, but also spontaneously or organically in the institutionalised educational culture. Knowledge, understanding and acceptance of institutional differences are also an important basis for understanding the impact on everyday life, the resulting conflicts, organisational and cultural changes, and changing or unchanging pedagogical effects as phenomena.

Different educational institutions may have different pedagogical traditions and methods, which influence which technological tools and solutions are considered appropriate and effective for facilitating learning and teaching. These are, on the one hand, a pre-existing set of habits, and on the other

hand, the relevant knowledge and competence, as well as individual or group attitudes towards them. Note that the internal culture of the institution would have changed without the innovation effect.

Educational institutions operate in different social and cultural contexts, which can influence the perception and use of technological innovations. Cultures have different levels of receptivity to change and different ways of understanding the role of technology in education. Attitudes to change, which may be inherently different in different social contexts, should be highlighted. The clientele that defines the institution may also play an important role in the institutionalisation of technological innovation. In particular, the environmental impact of public education institutions can have a very strong influence on the acceptance, uptake or even integration of innovation. Adult education institutions should not ignore the expectations of their industrial and market partners or the technologies they use. The role of the institution in society and the obligations arising from its position in the development of the sub-region are also important aspects.

Institutional structure and organisational culture influence how educational institutions decide to introduce and use technological innovations. A more flexible, open organisational culture can facilitate faster adaptation of innovations, while a more rigid, conservative institutional environment can make it more difficult to adopt change. Thinking about innovation, attitudes to technological innovation and actual operational action can also be influenced by the extent to which the institution as an organisation knows itself and, on this basis, can be described as a learning organisation.

A typical example of the difference in pedagogical culture between institutions is the community of alternative and reform schools. Here, the tension between the traditional rejection of the use of technology and the expectations of knowing, understanding and changing the natural and social environment will be an interesting phenomenon. How can one operate a pedagogy of cognition and understanding with a destructive critical attitude towards technology that affects almost everything in the social and economic environment?

Educational institutions may have different objectives and priorities that can determine the extent to which they encourage and support technological innovation. Institutions or their educational programmes that prioritise the development of digital skills or digital pedagogical competences are likely to place greater emphasis on the adoption and use of technology. The fate of technological innovation within an institution is also influenced by the pedagogical goals and institutional plans for technology, as reflected in curricula. In an institution specialising in technology, there may be both internal and external expectations that technology, which is a priority in the curriculum, should be integrated into the everyday activities of education, e.g. a technical and IT institution may not be averse to this. The institution may also have a pedagogical programme outside the curricular profile of the institution, according to which technological competences play an important role in the preparation of students and efforts are made to avoid a deep gap between the learning environment of students outside and inside the institution.

## **The potential positive impact of ChatGPT as an innovative technology**

ChatGPT allows students to learn at their own pace and according to their interests. The AI-based assistant can adapt the learning material to individual skills and needs, facilitating a more effective and personalised learning experience. With ChatGPT, students in remote locations or disadvantaged communities can also access quality educational resources. This can help reduce educational inequality and promote digital equality. ChatGPT can help to reduce the administrative burden on educational institutions, for example by automating routine tasks such as processing student enrolments or answering frequently asked questions. It can also facilitate communication between institutions and students, ensuring faster and more efficient responses. ChatGPT can help teachers to compile curricula, monitor student progress and analyse learning outcomes. This allows teachers to spend more time with students and improve pedagogical methods while reducing the administrative burden. ChatGPT can be an excellent tool for improving language learning and communication skills. Students can practice the foreign language interactively while the AI assistant provides feedback and corrections. ChatGPT is able to collect and process information quickly, which can help students and researchers in preparing papers, projects and research. The AI-based assistant can support you in finding sources and relevant data, as well as provide ideas and guidance for structuring and formatting your work. ChatGPT can facilitate collaboration and communication between students and teachers, supporting the coordination and implementation of group projects and collaborative tasks. The AI assistant can organise and manage teamwork and effectively communicate tasks and feedback. ChatGPT can help to increase student motivation and develop independent learning skills by offering interactive and personalised learning. Students can become more engaged in the learning process and learn how to manage their own learning plans and goals (OPEN AI, 2023).

ChatGPT's self-reflection is in principle an acceptable and relevant response, but it should be complemented by a reflection on several expected positive effects. It is important to consider that ChatGPT is an ever-changing and improving technology that will not only become more accurate, but will also be used in an increasing number of ways with the help of related applications and services. Mentoring and coaching of students or teachers, or possibly parents, may be important in communication within the institution. In the case of institutions working with adults, support for communicating joint work with professional partners could also be developed. An interactive chat platform could not only play a role in supporting process management and reducing pupil dropout, but could also be an effective and continuously available option for institutional operations, based on an improving database. The mentoring of students may not necessarily be enhanced by this chat application, but by similar interactive chat applications. Interactive chatbots, built on internal institutional databases that are also privacy-preserving, can be an effective tool for tutoring and learning support. It should not be overlooked how significant the difference in quality between the external database of ChatGPT and the mentoring effectiveness of a similar chatbot built on an internal school database can be if personalisation is the most important aspect.

ChatGPT severely underestimates the potential of interactive educational content and digital learning materials. It is a major challenge and requires significant resources for institutions to produce interactive tasks, engaging online and digital learning materials, personalised practice exercises, self-checking questions and tests, and content summaries for learners. Of course, not only ChatGPT, which works from its own database, but also other applications can be of great

help in this respect (Quino, Learnt, Nolej are good examples of such solutions). ChatGPT can be both a source of educational content (with strong quality control) and can be used to structure, organise and present educational raw material in a variety of different formats.

ChatGPT is able to learn and evolve over time as more interaction and data becomes available. This allows the AI-based assistant to continuously adapt to educational needs and pedagogical methods, providing the best support for students and teachers (OPEN AI, 2023). Quality use requires that it is used only to solve tasks or support activities for which it is ideal. Many other AI-based support applications and tools exist and their development is set to explode in the near future. There are also several pedagogical functions for which ChatGPT may not be the best solution. Similar solutions, based on institutional databases and proprietary content and proprietary data, can not only be more effective but also provide a more sustainable service to institutions.

Note that the potential benefits are very similar for institutions teaching pupils of different ages and social status. There is not much difference in opportunities between the pedagogical culture of a public education institution and that of a higher education institution, or even an adult education institution. The differences are not so much the result of institutional specificities, but also of differences between learners. Adult learners' awareness, career socialisation aspirations, labour market experience and self-regulation may have very different expectations of new technologies compared to younger learners in general education.

## **Risk analysis of ChatGPT as an innovative technology**

AI-based assistants like ChatGPT collect and process large amounts of data. This data can include sensitive information such as personal details of students and teachers. Privacy and data security issues can arise, which can have a negative impact on educational institutions. Using ChatGPT and similar technologies, educational institutions and students may become overly dependent on AI assistants. This may reduce critical thinking and independent problem solving skills. Although ChatGPT has the ability to customize the learning process, the lack of personal interaction can negatively impact the educational experience. The teacher-student relationship and human interaction are important for student development and community building. AI-based assistants like ChatGPT are based on available data and its analysis. If the system is based on biased data, the results can be skewed, leading to discrimination and inequality in education. The spread of AI assistants in education may raise concerns about the job security of teachers and administrative staff. While ChatGPT may support teachers, it may also lead to staff redundancies if the technology is generalised. The spread of ChatGPT use could increase the digital divide between institutions that cannot afford the technology and those that can. There may also be ethical issues associated with the use of ChatGPT, such as transparency of algorithms, potential bias, and the quality of AI-generated learning materials (OPEN AI, 2023).

Importantly, ChatGPT did not mention or raise the possibility of plagiarism or fraud in its self-reflection. It is probably not the most important risk and negative impact on the pedagogical culture of the institutions. Most educational reforms of the past decades have also aimed at replacing the pedagogy of information reproduction with a pedagogy of competence development. The huge databases of AI tools and applications and their rapid deployment have indirectly reinforced this



trend and expectation. In particular, ChatGPT can be used to deceive in situations where information reproduction tasks need to be solved. This pedagogical thinking is indeed seriously threatened, but this is not really a big problem, but another effect to push the changes forward. This phenomenon will once again bring to the surface the debates about the unnecessarily generated and in fact transversal opposition of 'literacy or competence'. It must be accepted that competence development cannot be effective or productive without adequate literacy, but this is not reason enough to remain within the information-reproducing pedagogical paradigm. Learner productivity, cooperative and collaborative tasks, project work, or even personal soft skill development will be a priority in the social and economic expectations of the coming generations and sooner or later pedagogical thinking in each institution will have to be adapted accordingly.

The emergence of an innovative technology within an institution will always affect the institutional division of labour and may have some impact on the content of jobs or even on the different jobs and statuses. This is a natural phenomenon and not only a consequence and effect of ChatGPT. In a superficial approach to technological innovation, the question of whether or not technology can change one's occupation and job is regularly raised. A more popular version of the same is whether teachers can be replaced by innovative technology and if so, what negative consequences might this have? If teachers have such poor pedagogical performance and there is such low pedagogical added value that they can be replaced by any technology, then this will happen in time anyway. The challenge with this phenomenon is precisely that there is no low pedagogical performance that can be replaced by technology, and this is not a problem of the emergence of innovative technology, but a problem of low pedagogical performance. Such low pedagogical performance should not exist even if there were no innovative technology, and such low pedagogical performance requires intervention and radical change even if there is no technological change. It is not innovative technology that will take away teachers' jobs, it is teachers who use innovative technology well and effectively that will take away the jobs of teachers who do not know or reject innovative technology, or at least a significant part of it.

When reviewing the risk analyses, we must note that despite the differences between institutions teaching students of different ages, the risks are very similar for public education, higher education and even adult education programmes. Again, the differences are more strongly influenced by age differences than by individual differences between institutions.

## **Institutional reflection on technological innovation as an indicator**

Institutional reflection shows how open an institution is to the introduction of new technologies and methods. The level of openness and acceptance can affect the institution's ability to exploit the potential of technological innovation. Institutional reflection reflects the institution's ability to adapt to technological changes and paradigm shifts in education. Adaptability is an important factor for the long-term success and competitiveness of an institution. Institutional reflection can identify areas where combining technological innovations with pedagogical methods can create opportunities for more effective and engaging educational experiences for learners. This can help to increase learner motivation and achievement. Institutional reflection reflects the internal culture and values of the educational institution. Openness to innovation and acceptance of technological advances is part of the

culture, influencing the institution's ability to successfully adopt and integrate new technologies. Institutional reflection can shed light on an institution's willingness to invest in new technologies and educational innovation. The level of resources and support can have a significant impact on the successful adoption and sustainability of technological innovation (OPEN AI, 2023).

In addition to their actual impact, technological innovations are also an excellent way of simply assessing the organisational maturity of an institution. The process that follows can be a simple thought experiment, but it can also be a management tool that can be implemented in practice. The institution should be given a mandate to use the innovative technology from the next semester onwards. It is not an immediate introduction nor an organic roll-out, but an opportunity to prepare and plan for it. Institutions generally (and quite rightly, for the most part) react to this kind of exercise in a negative or at least critical way. They list the reasons why it is not possible, why it is risky, why it cannot be done and, if it is compulsory, what is needed to do it. This institutional review, with minor adjustments, essentially shows the organisational maturity and, reformulated, could form the basis of an operational development plan for the next few years of the institution. This simple procedure has been very useful not only for the emergence of ChatGPT but also for other technological innovations. Examples include the emergence and accessibility of the Internet, the widespread use of mobile phones by students, or even the foreseeable period of the spread of interactive whiteboards. The procedure applies not only to technical tools but also to online applications or methodological solutions. Examples include the development and launch of MOOCs (Massive Open Online Courses) for institutional dissemination, the introduction of LMSs (Learning Management Systems) to ensure transparent and verifiable learning support, or connectivist online networking between a class in one school and a similar class in another school very distant in space.

Note that these innovations and their associated reflections and development eras were at some point very similar to the emergence of ChatGPT. The institutional reflection on technological innovations in each of the previous cases showed clearly what challenges the particular institution was facing at that time and place, what stages of development it was stuck in and why, and what changes were needed in the period that followed.

## **Categorisation of institutional responses to pedagogical cultures**

The specific pedagogical cultures of different institutions may reflect differently on the emergence of technological innovation. Different technologies may also have given rise to different reflections, but for clarity and understanding, it is also worth grouping them together. No two institutions are the same. Nor are technological innovations the same, nor can their expected impact be the same. And different institutions can of course provide very different reflections on different innovations. By understanding and studying them, and in particular by understanding their similarities, we can group individual phenomena.

In this overview analysis, and in the rest of the study, we do not deal separately with public education, higher education and adult learning, as there is no justification for doing so on the basis of the potential positive impacts and risk analysis, and a more detailed analysis would be beyond the current format of the study.

We accept and consider it important that institutions cannot be considered homogeneous and that the pedagogical culture of a given institution can vary considerably within the institution. No two educators are the same, and therefore the response to technological innovation cannot be exactly the same. The theoretical analysis now approaches the basic question at the level of institutional reaction and only partially or not at all addresses differences within the institution. It is conceivable that differences within institutions may be even larger than differences between institutions, but determining this is not a theoretical analytical research idea

### *Ignoring or underestimating the importance of innovation*

There may be several realistic and more qualified reasons for an institution to ignore the emergence and use of technological innovation (especially ChatGPT). Reasons may include lack of resources, resistance to change, privacy and ethical issues, technological drawbacks and limitations, lack of infrastructure, and different priorities and objectives. Institutions may have limited resources and may incur costs to implement technology that some institutions cannot or do not want to cover. This may include the purchase of technology, maintenance and upgrades, and the development of the necessary infrastructure. The digital divide and less developed infrastructure may leave institutions unable or unwilling to adopt these new technologies. The perceived and real limitations of innovative technology, such as inaccurate information or loss of context, may encourage institutions to adopt a wait-and-see attitude until the technology matures and becomes more reliable. Institutions may have other priorities that take precedence over the implementation of ChatGPT or other AI-based tools. Educational institutions face many challenges and tasks and may choose to focus on other areas (OPEN AI, 2023).

Moreover, the disregard for technological innovation can often be traced back to the "procrastinate, postpone, there is still time and no need to rush" attitude that is ingrained in institutional culture. This may be partly justified, but technological innovations usually involve rapid changes, to which it is worthwhile and important for institutions to respond. Technological hype explanations may also be at the root of this disregard. The institution may not want to allow a strong negative or even a strong positive impact on the overall institutional culture. The hype phenomenon sees all innovations initially as unrealistically positive, all good things. Of course, no innovation can live up to these unrealistic expectations. This is followed by complete disillusionment when the unrealistic expectation fails. The same can happen not only with positive content but also with negative content. The institution develops unrealistic negative fears and sees new technology as an all-consuming threat. This, of course, like the positively unrealistic expectation, also fails. If the institution is aware of the hype phenomenon, it can consciously stay away from adopting the technology because it knows that it is worth waiting for a productive and realistic or life-like period after the hype. If it is not aware of the hype phenomenon, then its fears are so great that they may in themselves be an obstacle to any change.

Often, the disregard for innovation is due to pedagogical misconceptions or to strong and dominant pedagogical myths. It is not uncommon for an institution to think superficially, erroneously or even contradictorily about one or more pedagogical issues that may be related to innovation, based on the need to conform to or identify with the social context. Examples include digital generation theory (digital natives and immigrants), multitasking, learning styles, etc.

Leaders and teachers at the institution may not fully understand the workings and benefits of ChatGPT and AI-based technologies, which may lead to a lack of recognition of the potential



positive impacts. If the institution has tried new technologies in the past and they have not produced the expected results or have caused problems, managers and teachers may be sceptical about ChatGPT and similar tools. The limitations and shortcomings of ChatGPT, such as incorrect information, loss of context or language, may encourage institutions to underestimate the importance and positive impact of the technology (OPEN AI, 2023).

*Conservative regulation: rejection, denial, prohibition, strong restriction*

Institutions can raise concerns about data protection and the security of students' personal data. For this reason, they may be wary of using ChatGPT and similar AI-based tools. The use of ChatGPT also raises ethical issues such as algorithmic bias and discrimination. Institutions may choose to reject or limit the use of the technology to avoid such issues. It may be that the use of ChatGPT does not fit in with their pedagogical principles, or that the use of the tool may reduce students' independent thinking and problem-solving skills. The use of ChatGPT may undermine the role and authority of teachers in the classroom, which may have a negative impact on student performance and teacher-student relationships. In some countries or regions, regulatory authorities may require educational institutions to comply with certain legal and regulatory requirements that may restrict the use of ChatGPT and similar technologies (OPEN AI, 2023).

Teacher authority or, more broadly, the role of the teacher and the teacher's perception of him/herself is very much determined by the local institutional culture. An institution based on reform pedagogy has an almost entirely different view of the role of teachers than a performance-oriented and correspondingly strict teaching community. Innovative technology alone will cause problems in the interpretation of the teacher's role, especially where the pedagogical approach is dominated by the mediation and reproduction of information. If the teacher's authority is based on the role of information source, then ChatGPT may indeed cause problems, just as the existence of databases accessible on the Internet may have caused problems in the past.

Institutional prohibition may also be the quickest and least change-inducing solution (which is in fact a pseudo-solution). Prohibition is a dead end, because it both draws more attention to what is prohibited and creates the challenge to circumvent the prohibition. This is an extremely harmful indirect educational side effect, because the institution is trying to educate people to circumvent the rules by banning. The ban is primarily enforced and controlled within educational institution. It can also be tried outside, but its effectiveness will be critically low. And the significant difference between reasonable and pragmatic use inside the institution and outside the institution further reinforces the difference between the institution and everyday learning environments, which is particularly detrimental to the learning and competence development of students. A strong restriction is somewhat better than a total ban, but the institution's main task should be to teach the use of innovative technology for learning both within and outside the institution and thus to help students develop their competence. This may also be an expectation of the labour market environment or, in the case of adult learners, of general life skills support. The exemplary demonstration and teaching of critical and reflective, health-conscious and constructive use is a core task of the institution, not only for new learning support technologies, but for all ages.

Rejection or strong criticism may be based on dysfunctional or inherently destructive experimentation, where failure or failure in principle may be enough evidence to confirm a previously predetermined decision. If the intention is basically to prohibit, but to confirm this with concrete cases, the innovative tool is tried in a way that is completely different from the expected functions

or realistic use. ChatGPT, for all its good features, has a number of bugs or content that could be interpreted as bugs by the tester. Despite its ability to keep learning and getting better, it is relatively easy to find flaws. For example, it is sufficient to ask a local specific subject question that is not in its database but is important within the institution. The absence of an answer to the important question or an incorrect answer may be sufficient to confirm and validate the prohibition.

The institutional appearance of ChatGPT has many similarities with the task of wikipedia usability in schools. Wikipedia can be conceived as a passive encyclopaedia or as a collaborative community knowledge space that can be continuously developed. If we think of it in the former, too simplistic approach, it will be relatively easy to find fault. In this case, we could still strive to correct the error and increase the community knowledge, but they could also remain in the passive lexicon view, in which case the error could again be a justification for the ban already imposed earlier. If we interpret it as a community knowledge space, then of course it is not the errors that are the most important. And if we do find an error, it will not be the error that will be disseminated, but the correction, extension or addition will be a source of pride. ChatGPT is not directly editable, but a learning algorithm can only get better with user activity. Wikipedia is editable and it too has some user activity. The two tools are not exactly the same, but the dysfunctional trial and error as a basis for disabling or restricting may be very similar.

#### *Passive acceptance and moderate acceptance, indifference*

Institutions may want to explore the technology cautiously at first, and test its effectiveness and impact with small-scale experiments before rolling it out more widely. They may have limited resources and only be able to invest moderately in the development of ChatGPT and related infrastructure. In such cases, they consider that it could be a useful tool to diversify pedagogical approaches, but they do not want to completely transform existing teaching practices. Initially, it will be used moderately to monitor and evaluate educational processes, for example to review teaching materials, analyse student performance or evaluate pedagogical methods. Institutions may choose to use ChatGPT mainly as a support and resource for teachers and trainers, without significantly affecting the direct educational experience of learners. In some cases, they may think it is important to keep up with technological developments, but do not want to be totally dependent on a single tool or method. Accordingly, they adopt and integrate ChatGPT to a moderate extent. Institutions may have many priorities and limited resources. Thus, they may decide to focus on other areas such as infrastructure development, teacher training or updating teaching materials. Leaders and teachers in institutions may not be aware of the benefits and potential of ChatGPT and thus may not consider it important to integrate the technology into the education system. There is often resistance within institutions to adopting new technologies and methods, especially when they require significant changes to existing practices. Technology is evolving rapidly, and managers and teachers in institutions may feel that they cannot keep up with changes and therefore remain indifferent to the latest tools and solutions. They may question the effectiveness and relevance of ChatGPT in education and therefore not consider it important to adopt the technology. This indifference may also mean that institutions have not yet decided how to respond to the technology or are waiting for more information and evidence on its impact and benefits (OPEN AI, 2023).

It should also be mentioned that this is probably not the first technological innovation opportunity in the life of an institution and that there may have been a number of bad and unsuccessful implementation attempts, the adverse impact of which may lead to an unjustified fear of any

further innovation opportunities. It is also worth highlighting the possibility that the institution will carry out a realistic risk analysis and, based on its self-reflection on its own pedagogical culture, come to the point where it recognises that the risks are too great for it in the situation and therefore temporarily stops being proactive and lets the process evolve on its own. Activism at institutional level may not always be the best solution. Many institutions may well think that a sustainable and effective pedagogical culture can only develop organically, so instead of targeted interventions they let things happen and the functioning pedagogical culture and school community do something about innovation based on past processes.

*Active use: communication, content generation, interactivity*

Institutions can actively use technology to improve the efficiency and quality of education. ChatGPT enables individual learning pathways and differentiated instruction, which can help students learn at their own pace and level. Institutions can take advantage of this feature to better serve the needs of learners. By using the new technology, institutions can make educational materials and support more accessible to learners from different backgrounds, thus promoting equal opportunities. Leaders and teachers in institutions may be open to innovation and new methods and are actively choosing to implement ChatGPT to refresh and modernise teaching practices. Institutions can actively use ChatGPT to gain a competitive advantage in the marketplace, making themselves more attractive to current and prospective students, as well as to donors and funders. They can reduce administrative and other costs, for example by answering student questions, automating the creation and updating of course materials, or supporting teachers' work. Institutions can actively use ChatGPT to prepare for future technological developments and changes in the labour market. As AI and digital technologies play an increasingly important role in the labour market and society, it is important that students and teachers learn about and use these tools to be successful in the future (OPEN AI, 2023).

Contrastingly, ChatGPT can help to build and strengthen the community of educational institutions, for example by supporting collaboration and communication between students, or by facilitating interactions between teachers and students. Its use creates opportunities for teachers to learn new pedagogical methods and develop their digital competences. In this way, the organisation can contribute to the professional development and motivation of teachers. Innovative technology can be seen not only as a daunting challenge but also as a positive context for development. If an institution is constantly working on its methodological development or striving for continuous quality improvement, an innovative technology can be a good opportunity to move forward. The introduction of ChatGPT provides an opportunity for the institution to use new, innovative and creative methods in education. This can help to increase the competitiveness of the organisation and improve the overall satisfaction of the community. Using ChatGPT can help increase student and teacher engagement in the educational process, as interaction with AI-based tools can make learning and teaching more interesting and engaging.

### *Proactive experimentation: turning innovative ideas into good practice*

The ChatGPT pilot will provide an opportunity for institutions to explore new educational opportunities and methods that can improve learning processes and outcomes. This can help institutions to better understand how they can use technology to improve the learning environment and student performance. Proactive experimentation can encourage educators to try new pedagogical approaches and tools that can contribute to improving learning processes and educational outcomes. ChatGPT's proactive experimentation allows institutions to share experiences and best practices, which can facilitate the continuous development of teaching methods and tools. Proactive experimentation can contribute to the flexibility and agility of an organisation by allowing it to respond quickly to new technologies, changing student needs and challenges in the educational environment (OPEN AI, 2023).

Experimenting with innovative technologies (especially if the results are positive or the conclusions are instructive in many respects) can also have a strong impact on the development of positive attitudes and proactivity towards other technological innovations. For many institutions, the emergence of new technology can be a major challenge or even an insurmountable task. A well-established, tried and tested best practice in a similar institution is perceived and accepted as more credible. In such cases they are more motivated to implement than if they read an overly theoretical guideline or methodological model somewhere. The methodologically correct misuse of innovative technology can even be transformed into a marketable educational product, which can enhance the reputation of the institution or serve as a source of income. Of course, every institution is different and therefore other institutions cannot adopt good practice in a one-to-one way, but a case study, documented and analysed in detail, can be an effective tool for any institution open to such a possibility. And the success of proactive experimentation can be a working good practice that can be presented as a real refutation to institutions that are sceptical, prohibitive and rejecting innovation. Not all trials and experiments produce positive results, but the lessons learned from negative results are also valuable experiences. Not only can they be used for continuous improvement, but they are in themselves indicative of the reaction of a mature organisational culture to some innovation.

Adopting the use of ChatGPT in education as good practice can help build and strengthen the professional community, encouraging pedagogical innovation and sharing of best practices between institutions. Proactively trying out an innovative technology can in itself strengthen institutional identity and joint professional work and reflection can indirectly have a positive impact on the school community. In particular, it is good if the experimentation of a technological innovation is not only a task for the teacher, but also involves the active participation of the learning community, or even school support organisations and parents. In the case of adult education, the integration of innovation technology into everyday educational life is already a labour market expectation. Developing and applying good practices in innovation can help institutions to increase competitiveness and recognition at local, regional or international level.

### **Potential impacts and expected changes**

Technological innovation can further increase the differences between institutions, partly based on accessibility and partly on the reaction of the institutional pedagogical culture. Some

institutions have the opportunity for early adoption and implementation of technology and take this step. In others, this may be realized later or not at all. This can influence educational outcomes and students' ability to effectively use technology in the short term, further increasing the added value, pedagogical performance, and differences between institutions. The development of teachers' and educational professionals' skills and knowledge, as well as students' abilities, is essential for the successful application of ChatGPT technology. The differences between institutions may also grow depending on the extent to which they are able to support professional development and training in the use of technology within the institution.

In this study, we analyzed the institutional level, but it is important not to overlook the fact that very few institutions are uniform. It is more common that there are significant differences among the teachers and students working there in relation to the use of innovative technologies. The analysis of these differences is not the task of a theoretical study but should be uncovered by empirical educational research, drawing conclusions based on quantified information. It will also be the task of empirical educational research to examine how and why the reactions chosen or produced by institutions differentiate over time or change. It is conceivable that the institutional response to innovative technology may not change or change only slightly over time, but it is more likely to evolve continuously. Understanding this phenomenon can also contribute significantly to describing the phenomenon of institutional organizational maturity.

In our analysis, we focused on institutionalized education, that is, we examined the impact on formal and institutional pedagogical culture. We did not deal with the non-formal, market-based educational environment. This topic can also serve as the basis for a separate study and analysis in the future. It is clear that market-based education, due to its market advantage or even profit orientation, will proactively approach this technological innovation as much as possible. We can also be almost certain that the distance between institutional education and market education will continue to grow. This is partly natural and partly a consequence of the logic of market services complementing institutional education. This combined effect will further increase existing social and economic differences, as access to market-based education, whether in public education, higher education, or especially adult education, is limited to the wealthier individuals, while the poorer ones with the greatest need cannot access it.

It will be an interesting phenomenon to see how learners (especially adult learners capable of high-level self-regulation and with strong motivation) discover how the technology can be used for independent learning. If the methodology for this learning approach develops and best practices become widespread, then the use will reach a much higher methodological level instead of the obvious tricks and potential cheating. This poses additional challenges for institutions, which will have to deal with the fact that a standalone, constantly updated, and interactive technology can effectively support individual and independent learning, completely independent of institutional learning expectations and tasks.

## Literature

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