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Кваліфікаційна робота

ПЛАНУВАННЯ УРОКІВ ЗА ДОПОМОГОЮ ШТУЧНОГО ІНТЕЛЕКТУ ДЛЯ ВЧИТЕЛІВ АНГЛІЙСЬКОЇ МОВИ ЗАКАРПАТСЬКИХ ШКІЛ

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ЗАТВЕРДЖЕНО
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Ministry of Education and Science of Ukraine

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Department of Philology

Qualifying paper

AI-ASSISTED LESSON PLANNING OF TRANSCARPATHIAN SECONDARY ENGLISH TEACHERS

Level of higher education: Bachelor’s degree

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Зміст

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List of Abbreviations

AI: Artificial Intelligence

AIED: Artificial Intelligence in Education

CALL: Computer-Assisted Language Learning

dComFra: Digital Competences Framework (Ukrainian context)

DigCompEdu: Digital Competence Framework for Educators (European framework)

EFL: English as a Foreign Language

ELT: English Language Teaching

GDPR: General Data Protection Regulation (European Union)

ICTs: Information and Communication Technologies

ITS: Intelligent Tutoring Systems

LLMs: Large Language Models

LMS: Learning Management System

MALL: Mobile-Assisted Language Learning

MoESU: Ministry of Education and Science of Ukraine

NAES: National Academy of Educational Sciences (Ukraine)

OECD: Organisation for Economic Co-operation and Development

TPACK: Technological, Pedagogical, and Content Knowledge

UIED: Ukrainian Institute for Educational Development

Introduction

The rapid integration of artificial intelligence (AI) into education marks a pivotal shift in pedagogical paradigms, fundamentally reshaping how educators conceptualize, design, and deliver instruction (Holmes, Bialik, & Fadel, 2022). In the realm of English Language Teaching (ELT), AI-powered tools ranging from generative language models to adaptive learning platforms offer unprecedented opportunities to enhance lesson planning, personalize learning experiences, and streamline administrative tasks (Luckin, 2016; Peikos, 2025). However, this technological revolution unfolds unevenly across global and regional contexts, with adoption shaped by infrastructural realities, teacher readiness, and cultural nuances.

In Transcarpathia, a linguistically diverse and geographically peripheral region of Ukraine, secondary English teachers navigate a complex landscape where national ambitions for digital education collide with local challenges, such as intermittent internet connectivity, limited hardware, and varying levels of digital literacy (Stepanechko, 2022). This region offers a compelling subject matter for investigating AI-enhanced lesson planning, as it presents both the promise of innovation and the obstacles to equitable integration. The relevance of this topic lies in its potential to bridge digital divides, foster inclusive pedagogy, and enhance the quality of ELT instruction across underserved communities.

Thus, the **subject** of the research is the use of AI in EFL, as the thesis explores how these educators perceive and engage with AI-assisted lesson planning, situating their experiences within the broader interplay of global AI trends and Ukraine's evolving educational reforms. Therefore, the object of the research are Transcarpathian English teachers and their lesson planning habits. The **aim of the research** is to assess the current state of AI use in lesson planning among Transcarpathian secondary school English teachers and to identify key factors that enable or hinder its integration. The study is guided by the following **main research questions**:

- What are Transcarpathian English teachers' attitudes towards AI-supported lesson planning?
- To what extent are AI tools currently used in lesson planning in this region?
- What perceived benefits, barriers, and training needs do teachers associate with AI use?

Lesson planning, long regarded as the keystone of effective ELT, requires teachers to meticulously align instructional objectives with curriculum standards, student needs, and pedagogical strategies (Richards & Bohlke, 2011). This process, inherently reflective and dynamic, has been transformed by AI's capacity to generate tailored content, automate routine tasks, and provide data-driven insights (Selwyn, 2019). In Transcarpathia, where schools serve Ukrainian, Hungarian, Romanian, and Rusyn-speaking students, the promise of AI lies in its potential to create culturally responsive and differentiated lessons that address diverse linguistic competencies. Yet, practical barriers, such as unreliable internet, limited access to advanced devices, and insufficient teacher training hinder widespread adoption (Ivaniuk & Ovcharuk, 2020).

The primary objective of this thesis is to investigate how AI tools are currently used or could potentially be used in lesson planning within this unique regional context, and what professional development or systemic support would be needed to maximize their pedagogical value. The following **hypotheses** are proposed:

H1: Teachers with higher digital competence and fewer years of teaching experience are more likely to adopt AI-supported lesson planning tools.

H2: Perceived usefulness and ease of use strongly influence willingness to implement AI tools in the classroom.

H3: Institutional support and training significantly affect actual integration levels of AI in pedagogical planning.

Ukraine's national policies, including the 2022 General Secondary Education Act and the "New Ukrainian School" reform, champion a digital and inclusive educational environment,

yet regional disparities reveal a gap between ambition and implementation (MoESU, 2020). Transcarpathian teachers, often reliant on basic tools like Google Classroom or publisher platforms, express cautious optimism about AI but cite time, training, and ethical concerns as significant hurdles (Stepanechko, 2022; Edcamp Ukraine, 2023).

This study employs a mixed-methods approach to capture the breadth of AI awareness and the depth of practical engagement among Transcarpathian English teachers, offering a nuanced understanding of their attitudes, experiences, and aspirations. By integrating quantitative surveys with qualitative insights, the research examines how digital competence, prior technology exposure, and institutional support influence AI adoption (Mishra, 2006). It draws on global case studies such as Singapore's INTELLITASK, Chile's ProFuturo, and Estonia's eKool AI Tutor to distill best practices, emphasizing contextualized tool design, robust professional development, and ethical frameworks (Ng et al., 2023; Vega & Rojas, 2022; Pärtel & Kask, 2024).

These examples underscore the importance of teacher agency, localized content, and hybrid deployment models, particularly for regions like Transcarpathia, where offline functionality and cultural relevance are critical. The study also addresses potential **pedagogical implications**, from the risk of over-standardization to concerns about data privacy and digital equity, advocating for a human-in-the-loop approach where AI augments rather than supplants educator expertise (Selwyn, 2019; Fjeld et al., 2020).

PART I Theoretical and Contextual Foundations of AI-Enhanced Lesson Planning in English Language Teaching

1.1. Understanding Lesson Planning in English Language Teaching

Integrating artificial intelligence into education is increasingly reshaping the processes of designing, delivering, and evaluating instruction, particularly in the field of English Language Teaching (ELT) (Holmes, Bialik, & Fadel, 2022). Any modern lesson planning or educational innovation activity today would have to involve the use of AI-powered tools such as adaptive platforms, intelligent tutoring systems, and language processing applications (Luckin, Holmes, Griffiths, & Forcier, 2016).

In general, the use of AI tools in an educational setup doesn't merely represent a technical enhancement; it signifies a change in a particular way of thinking about pedagogy, for example, where algorithms can uphold personalization, formative feedback, and sometimes even generation of specific content (Selwyn, 2019). In ELT in particular, AI tools such as language generation models and speech recognition systems are enabling increased efficiency in the design of differentiated tasks geared towards specific learner competencies (Peikos & Stavrou, 2025).

It is often said that lesson planning is the keystone of successful teaching of the English language. In a word, a lesson plan is a detailed outline of what will be taught, the materials that the teacher will use, and the activities during a given lesson. Thus, it becomes a sort of "guide" for the teacher, gently steering him or her in the orderly pursuit of set instructional targets and objectives. As Richards and Bohlke (2011) put it, well-designed lessons align the content, timing, and methodology to meet particular learning objectives. The latter function would include language-oriented areas (e.g., grammar, vocabulary, skills practice) within ELT lesson-planning schemes that weave in elements of pedagogy (e.g., communicative tasks, guided practice). Shen, Coombe, and Wang (2007) are also eloquent in stressing that lesson planning

is a process enabling teachers to reflect deeply on pedagogical content knowledge: planning obliges a teacher to think through the content, predict difficulties that learners may have with it, and select the representations (texts, examples, tasks) that will make the language input understandable. That is, lesson planning may go beyond a mere administrative requirement but involves complex constructive reflection upon how teachers interpret their curricula and respond to their learners.

The investigation has shown there is a strong correlation between lesson planning and lesson delivery. For example, Aljohani and Ahmad (2025) identify lesson plan quality as being strongly positively correlated with student learning outcome achievements in an EFL context, commenting that "a workable lesson plan is key to achieving lesson objectives." Likewise, Shen et al. (2007) characterize lesson planning as a professional obligation. In comparing both Chinese and American teaching contexts, it is found that Chinese teachers, who spend considerable time in detailed planning, view each lesson as being "an important responsibility" for quality. In contrast, teachers in many other cultures, who do not have enough time for planning anymore, perceive their plans as merely a list of activities. What seems to be cross-culturally significant is that, generally speaking, effective English instruction is associated with thoughtful design of lessons. Lessons adequately planned afford continuity (from the yearly curriculum to unit and daily plans) and clearly indicate the purpose of each lesson (i.e., to introduce new language, review old, or practice skills). In this light, lesson planning functions as a bridge between syllabus goals and actual sequence in the classroom that enables teachers to ascertain that content links and learning proceeds incrementally.

However, many teachers struggle with effective lesson planning. It is especially tiring for a new teacher. Li and Zou (2017) find that inexperienced EFL teachers battle planning flexibility, while experienced teachers adopt a more intuitive planning style. Richards and Bohlke (2011) note a beginning teacher will concentrate on listing activities in a classroom without linking them to objectives or students' needs. In contrast, seasoned teachers treat planning as a tool for professional development since they adapt their plans after instruction to reflected improvements for the next time (Shen et al., 2007). This, therefore, shows that lesson planning is not a mechanical task; rather, it is an art that is perfected by experience. On the whole, ELT

literature considers lesson plans as key in organizing language input as well as classroom interaction; on the other hand, it recognizes that producing effective plans is usually time-consuming, needs training, and a bit of reflection (Shen et al., 2007; Richards & Bohlke, 2011). Understanding lesson planning in ELT requires viewing it as a dynamic process that sets learning objectives, organizes classrooms with communicative tasks, and involves deliberate pedagogical choices to meet learners' language needs.

1.2. The Role of Technology in Language Pedagogy

English language pedagogy has undergone transformation due to educational technology, which brings various tools, methods, and configurations into the classroom. Educational technology may be defined generally as "the theory and practice of designing, producing, using, and evaluating learning processes and resources." In this age of technology, language teachers can use almost any technological tool from audio-visual media to interactive language apps to aid their instruction. It is said in academic circles that ICTs have really brought about changes in the manner in which students learn languages. For example, Yadav, Misra, and Yadav (2018) state that modern digital tools have altered interpersonal communications, whereas Hollands and Escueta (2019) argue that technology has altered many learning strategies and teaching methodologies. Reinders and Benson (2017) point out how technology has offered English language learners new possibilities to communicate with native speakers and really authentic English (e.g., through social media, online exchanges, and global video communities). In other words, the walls have been opened to the world: learners, through video conferencing and language forums, now can practice English with peers across the world and can also access multimedia resources (such as films, songs, websites) that expose them to different accents and cultures.

There is one more to be highlighted into technology: learner engagement and motivation in language pedagogy. Educational psychologists like Golonka, Bowles, Frank, Richardson, and Freynik (2014) consider that achieving learner engagement stands as a supreme goal of technological applications in the classroom, with the process of creating social interactions as

an adjunct. Digital media attract students' interest by treating language formation as a fun activity or by appealing to many senses. Computers and mobile devices may be used to integrate text, images, sound, animation, and hypermedia into meaningfully interactive contexts for language practice. This multisensory kind of input encourages learners to focus on language forms being used in context; for example, subtitled videos or animated stories may introduce better ways to apply new vocabulary (Butler-Pascoe, 1997). Indeed, studies have revealed that learners tend to be more motivated in activities where language is learned through technology; Selwyn (2019) says technology-rich tasks encourage student involvement, potentially providing opportunities for variety and self-exploration. Moreover, Golonka et al. (2014), among other researchers, refer to many technologies that foster peer interaction (e.g., collaborative writing in wikis, forum discussions, or chat rooms) that can boost communicative confidence. For this reason, rather than simply acting as a paper-and-pencil substitute, educational technology transforms lessons into empowering interactive engagements with which students can build a rapport.

Technology has provided English teaching with more practicable pedagogical advantages. For example, Computer-Assisted Language Learning (CALL) has become a legitimate field of study. CALL has a broad meaning: "the study of applications of the computer in language teaching and learning" (Levy, 1997). By example, CALL applications comprise drill-and-practice software, multimedia grammar presentations, and language games. Research has demonstrated the ability of such technologies to strengthen particular skills; in the same manner, Bensalem (2020) has shown that internet-based activities have a significant positive effect on EFL students' reading comprehension and communicative self-confidence, while Hassan Taj, Zandi, and Khodadady (2017) findings celebrated increases in vocabulary and reading through computer-assisted instruction. Mobile technology (MALL) augments these opportunities still further: language learning apps, podcasts, and smartphone-based activities allow students to practice English wherever and whenever they want. Godwin-Jones (2011) highlights the rise of language-learning mobile apps, noting that they allow for on-demand practice of speaking, listening, or vocabulary. Other improvements include speech-recognition systems for pronunciation practice and automated flashcard applications for spaced repetition of vocabulary words. By virtue of all such technologies, they can adapt to individual learner

needs and styles, something quite difficult to do in a traditional classroom setting. For instance, students who tend to be more introverted may prefer to write or practice speaking through text-to-speech software, whereas kinesthetic learners may find interactive language games to their liking. If integrated properly, technology can truly enhance the ELT curriculum and the way lessons are delivered.

According to Zengin and Aksu (2017), the whole education system is now substantially influenced by computers, the internet, mobile apps, and digital games, all of which can be harnessed as teaching aids. Spector and Yuen (2016) argue that for technology to be used effectively, one must have sound pedagogical design, not just mere gimmicks; however, when used well, digital technology offers teachers a means to vary their teaching approaches. Blended learning, for instance, often involves an integration of face-to-face classes with online activities such as watching a video lecture or doing online exercises. A further example is the flipped classroom approach whereby students watch grammar videos at home and spend class time on communicative practice. Basically, technology increases channels for input and interaction in language pedagogy, motivates learners through multimedia and social features, and makes learning time and place flexible (online courses, virtual classroom, language software) beyond the limits of the physical classroom. With these features, many teachers started integrating lead technologies in their usual teaching regime with the idea that modern language pedagogy is better with technology if used carefully.

1.3. AI in Education: Concepts, Tools, and Applications

Artificial Intelligence (AI) in the realm of education stands for computer systems that accomplish jobs which normally require the presence of human intelligence and are learnt from data and decisions. According to the UNESCO (2023), the broad definition of AI is "automation based on associations," whereby AI systems discover patterns in data and subsequently automate decision-making or predictions. This can be as diverse as recommending a vocabulary exercise or grading an essay. AIs are similar to earlier educational technologies but integrate machine learning and natural language processing to evaluate learner behavior and adapt responses to the learner's needs. An AI tutor can, for example, analyze a student's responses to

a quiz, identify areas of weakness, and generate practice questions targeted to those weaknesses, a step up from mere drill-and-practice of older CALL programs (Peikos & Stavrou, 2025).

Conceptually, AI in education encompasses a broad spectrum of tools and applications. On one extreme are Intelligent Tutoring Systems (ITS) and other AI-driven adaptive learning platforms. These track student performances and modify the sequence and difficulty of content - the system may let a student work on either easier or harder math or language problems based on previous answers, thus producing a real-time personalized learning experience. Aside from ITS and automated instruction, there is AI-powered assessment automation: for instance, AI can machine-mark objective-type tests or even apply algorithmic rubrics for scoring essays. Essay assessment AIs analyze traits in student writing (grammar, coherence, vocabulary use, etc.) and provide either feedback or grades (Mustafa, 2024).

The recent emergence of large language models (LLMs) and generative AI tools (such as ChatGPT, Bard, or Claude) has added new means of instruction to the inventory. Such bots can write texts, generate questions, or simulate dialogues. Educators have started experimenting with generative AI to augment or automate lesson planning tasks. Hence, Peikos & Stavrou (2025) states that AI-writing tools (e.g., ChatGPT) can be very helpful to teachers when drafting lesson activities and materials. Teachers describe desired objectives to an AI (e.g., "teach beginner English students how to use past tense verbs"), and the AI can suggest a lesson outline with exercises.

The generative capability extends beyond canned content: the AI writes language content with a certain degree of context awareness. Virtual teaching assistants interact with students through AI and natural language processing. Recent advances have shown that AI-assisted virtual assistants provide personalized support and articulate instant feedback and adaptive learning paths to students. For example, in language courses, a chatbot tutor may converse with learners, correcting grammar or vocabulary almost simultaneously within the dialogue. These tools may take some of the basic workload away from teachers, allowing them to invest more time in complex guidance (Mustafa et al., 2024).

Besides instant content generation and tutoring, AI tools also cover learning analytics and recommendation systems. Most modern Learning Management Systems (LMS), for instance, use AI to track engagement, assess likely outcomes, and alert teachers when at-risk students may fall behind. In language classes, AI-based analytics could identify specific linguistic errors learners tend to make (e.g., misuse of “a” instead of “an”) and then recommend targeted areas for review. Finally, technology-mediated translation and annotation tools have become more prevalent: platforms such as Google Translate or speech-to-text applications promote equal learning opportunities for multilingual and differently-abled students (Chen, Chen, & Lin, 2020).

The range of AI applications in education varies widely from front-line content creation to behind-the-scenes analytics all geared toward making teaching more adaptive, efficient, and individualized. However, the introduction of AI in education raises serious considerations. Researchers warn that the power wielded by AI comes with new challenges related to bias, privacy, and equity. For example, the U.S. Department of Education (2023) cautions that data-driven pattern detection can introduce bias if the training data reflects cultural or linguistic prejudices; thus, such systems need to be monitored for fairness. UNESCO’s Guidance for Policy-Makers (2021) also maintains that AI has "the potential to address some of the biggest challenges in education," but it equally poses risks to equity and inclusion, compelling policymakers to prepare teachers and students for the ethical use of AI.

Recent research on AI in Education (AIED) systems reiterates the need for transparency and teacher involvement in the development of AI tools. For instance, Mustafa et al. (2024) systematically reviewed literature on AI in education, noting that major tech companies (e.g., Google, Amazon) and governments are investing heavily in educational AI; nevertheless, the author stresses the need for guidelines to ensure technologies serve learners from diverse backgrounds equitably. In language classrooms, teachers express concern about overreliance on AI (e.g., students submitting AI-generated essays without learning) and the potential loss of human interaction. Hence, while AI offers many innovative toolsfrom chatbots to personalized learning platforms, its integration should follow pedagogical principles and include ethical safeguards.

Overall, the literature indicates that AI in education extends traditional teaching technologies toward large-scale personalization. Unlike static media, intelligent systems can adapt and offer scaffolding on demand to individual students. Examples include AI language tutors that provide one-on-one practice or curriculum design systems that align content automatically with standards. As a new field, some research remains exploratory. Yet early findings on AI applications for educators are promising: Peikos & Stavrou (2025) finds that teachers employing ChatGPT-based tools can rapidly produce a variety of science (and by extension, language) lesson materials, which they then vet and polish themselves. This suggests a future in which AI applications collaborate with teachers in planning and creating lessons. To conclude, AI in education introduces powerful concepts from predictive analytics to generative language models and a growing set of tools that can enhance English instruction when thoughtfully integrated with teacher expertise (Peikos & Stavrou, 2025; Mustafa et al., 2024).

1.4. Global Trends in AI-assisted Lesson Planning

Lately, there seems to be a worldwide trend where interest in employing AI to aid teachers in planning and teaching processes is rapidly growing. At the end of 2022, the emergence of advanced language models, namely ChatGPT, received global attention. Reports from teachers and policymakers indicate that since then, testing of generative AI chatbots for creating essays, teaching materials, quizzes, and classroom activities has been underway. For example, in the months following ChatGPT's release, many schools actively sought ways to leverage AI to support lesson development: teachers speak of using it to generate lesson plans and create customized assignments for students (UNESCO, 2024). Similarly, EdTech companies have begun embedding AI assistants within their products. Platforms such as MagicSchool.ai and Eduaide.ai - currently in pilot phases across various countries, claim to automate parts of the lesson planning workload. Typically, these applications allow teachers to input their desired learning objectives and receive draft plans comprising suggested activities, materials, and assessments. Early reports suggest an "80/20" collaborative workflow model, where AI handles most of the initial lesson generation, and teachers subsequently review and fine-tune the content (Selwyn, 2019). While rigorous academic assessments of these tools remain forthcoming, one clear trend emerges: companies worldwide are racing to provide AI-driven instructional design assistants.

Policies and professional bodies are now responding to this trend. Major international organizations have issued guidance on AI in teaching. UNESCO launched competency frameworks designed to help students and teachers navigate the AI era (UNESCO, 2024). These globally endorsed frameworks emphasize the importance of teachers developing critical understanding and digital literacy to ensure responsible application of AI tools in lesson planning and learning. Likewise, the Organisation for Economic Co-operation and Development (OECD) has produced guidelines promoting effective and equitable AI use in education (OECD, 2023). Developed in collaboration with teachers' unions, these guidelines stress the necessity of teacher training in AI literacy and advocate for teachers' active involvement in policymaking processes. It is widely recognized that safe and effective AI implementation cannot occur without substantial teacher participation.

Theoretically, many countries are proposing developmental programs to integrate AI into teacher education. For instance, Singapore and China plan to include AI education modules within their teacher training colleges. The European Commission has encouraged member states to adopt AI-based pedagogical tools, and some national curricula explicitly reference AI as both an educational subject and instructional tool. Empirical research on whether AI-assisted lesson planning improves teaching outcomes remains limited but optimistic. Beyond anecdotal reports, initial academic studies are underway: Peikos & Stavrou (2025) provides an early exploratory assessment, highlighting a science teacher's experience of using ChatGPT to generate lesson frameworks quickly, which are then personalized for their specific classes, significantly reducing planning time. Other pilot studies reveal that teachers using AI chatbots as brainstorming partners report receiving more diverse ideas for activities and lesson designs.

Globally, international conferences showcase dozens of presentations on AI in education, reflecting high academic interest. Nevertheless, education leaders must remain cautious and avoid uncritical adoption. The global discourse, echoed in reports from OECD, UNESCO, and educational scholars (UNESCO, 2021), centers on issues of equity and professional agency. Despite substantial investment by technology giants such as Google, Amazon, and Facebook in AI educational products, educational systems must guard against exacerbating digital divides (Mustafa et al., 2024). Many educators worldwide still lack the

infrastructure or support necessary to use AI tools effectively. Consequently, initiatives promoting “AI readiness” for schools have emerged. For example, UNESCO recommends that no AI tool should replace teachers; instead, AI should augment lesson planning under teacher supervision (UNESCO, 2021).

In brief, the surge in experimentation with AI-based lesson-planning tools is matched by efforts to create ethical frameworks guiding their use. From Silicon Valley startups to ministries of education, there is a global mobilization around AI’s promise for teaching. Early-adopter teachers emphasize AI’s capacity to perform the heavy lifting of initial lesson design, yet there is growing consensus that human oversight remains essential. If nurtured appropriately, these trends suggest that AI may soon become the default collaborative partner for educators in lesson planning.

1.5. Ukrainian Context: Policy, Practice, and Challenges in Transcarpathia

In Ukraine, national policies are increasingly promoting digital and AI-enhanced education, but implementation varies by region. The Ukrainian government’s recent reforms underscore technology as a key competency. The 2022 General Secondary Education Act calls for creating a “safe, inclusive and digital educational environment.” (MoESU, 2020). Likewise, Ukraine’s 2018-2020 digital economy strategy prioritized a “thorough national policy of digitization of education,” including connecting all classrooms to broadband and providing multimedia resources for teaching (Education Profiles, 2023). In line with this, the Ministry of Education partnered with the private sector on projects like “A Laptop for Every Teacher,” which by 2021 had equipped over 60,000 teachers nationwide with laptops. Policy efforts also include developing Ukrainian digital competency standards: the dComFra project (2018-2022) produced a national framework for teachers’ digital skills, aligned with the EU’s DigCompEdu model. More recently, in response to global AI trends, Ukraine has begun discussing an AI curriculum and teacher training in AI basics, though formal nationwide guidelines are still in early stages (UNESCO, 2024).

Despite these high-level policies, practical challenges remain acute in Ukrainian schools, especially in regions like Transcarpathia. The literature on remote teaching during

crises underscores that many Ukrainian teachers lacked prior training in online instruction. (Stepanechko, 2022) notes that at the start of the COVID-19 pandemic, most teachers were "unprepared" for online teaching and unfamiliar with digital platforms. In response, organizations such as the NGO Osvitoria, the online network Vseosvita, and international partners (British Council, major publishers) provided rapid training webinars and resources for teachers. These emergency measures helped many instructors adopt basic tools like Zoom, Google Meet, and Google Classroom for English lessons.

In Transcarpathia in particular, similar patterns emerged: local colleges of education reported that teachers scrambled to use synchronous video calls and asynchronous platforms (Moodle, Google Classroom) during lockdowns. However, the region's mountainous terrain and dispersed rural settlements often mean weaker internet infrastructure. Ivaniuk and Ovcharuk (2020) highlight that connectivity issues including slow service and frequent power outages regularly disrupt online lessons, forcing teachers to prepare alternative offline materials, such as emailing worksheets or utilizing educational TV broadcasts. These infrastructural constraints mean that high-tech AI tools may be out of reach for many rural schools in Zakarpattia Oblast.

Linguistic and administrative factors also shape practice in Transcarpathia. The region is multiethnic (with Ukrainian, Hungarian, Romanian, and Rusyn minorities), and some secondary schools teach through minority languages. This diversity can complicate standardization of digital resources; for example, an AI tool trained primarily on Ukrainian-language curriculum may not directly serve a Hungarian-language school. On the other hand, cross-border connections (with Hungary, Slovakia, Romania) have allowed some Transcarpathian schools to receive EU-funded support for digital education projects. For instance, the MeOut Helps initiative supplied digital equipment to Transcarpathian schools, aiding in their digital transformation effort (MeOut, n.d.).

Teachers' attitudes towards technology are evolving. In surveys conducted in western Ukraine, most English teachers express interest in using digital tools (e.g., language apps, online exercises) to engage students, but they also cite a lack of time and training to integrate them fully. According to Stepanechko (2022), Ukrainian English teachers increasingly rely on

publishers' online platforms (such as Oxford or Pearson "Online Practice") to supplement lessons. Transcarpathian teachers likely mirror this trend, using whatever digital resources are accessible. Anecdotally, some local language departments have experimented with bilingual AI chatbots for vocabulary drills, but these efforts remain sporadic.

In policy terms, Ukraine has signaled its intent to keep pace with global developments. The national "New Ukrainian School" reform (launched 2017) envisages full ICT integration in education, aiming to "significantly expand teachers' capabilities" through technology. The Ministry of Digital Transformation is active in creating AI centers (e.g., in Kyiv and Odesa) that may later impact education. However, as of 2024 there is no dedicated national program specifically for AI-assisted lesson planning. Instead, digital initiatives have focused on general e-learning platforms and digital literacy. It is likely that any widespread adoption of AI lesson-planning tools in Ukraine will first depend on strengthening basic digital infrastructure in schools (e.g., reliable internet, interactive whiteboards) and on professional development for teachers to become "AI literate."

In summary, Ukraine's context features ambitious policy goals for educational technology, but real-world constraints, particularly in regions like Transcarpathia temper how rapidly innovations appear in classrooms. Official strategies prescribe a "digital environment" and outline networks of educational e-platforms, and in recent years Ukraine has developed digital competence standards and provided thousands of devices to teachers. Nonetheless, challenges remain. Many Transcarpathian English teachers still face connectivity issues and limited training in advanced tools. As a result, while Ukrainian educational leaders encourage innovation, on-the-ground practice in Transcarpathia currently emphasizes basic technology integration (video conferencing, online exercises) over cutting-edge AI tools. Understanding this landscape is crucial: any introduction of AI-assisted lesson planning in Transcarpathian secondary schools must build on existing digital foundations and address local needs in training and infrastructure.

PART II AI Adoption in Lesson Planning: Global Perspectives and Transcarpathian Applications

2.1 Introduction to Global AI Integration in Education

In recent years, the rise of generative and adaptive AI tools has prompted educators worldwide to reconsider traditional approaches to lesson planning (Holmes et al., 2022). Transcarpathia, a linguistically diverse and geographically peripheral region of Ukraine, presents a unique context for examining how AI technologies are perceived and utilized by secondary English teachers (Stepanechko, 2022). Despite national reforms promoting digital literacy and competency-based education, many Transcarpathian schools continue to face infrastructural challenges such as intermittent internet connectivity and limited access to up-to-date hardware (NAES, 2023).

A mixed-methods investigation is therefore warranted to capture both the breadth of AI awareness among English teachers and the depth of their experiences integrating AI into lesson design (Mishra, 2006). Prior surveys indicate that while a minority of Ukrainian teachers have experimented with AI-driven content generation - primarily for quiz creation and grammar exercises - the majority remain unfamiliar with more advanced applications such as adaptive sequencing or automated feedback systems (NAES, 2023). Qualitative interviews further reveal that teacher confidence in leveraging AI correlates strongly with prior training in educational technology, underscoring the critical role of professional development (OECD, 2021).

Artificial Intelligence (AI) technologies have experienced rapid expansion across numerous fields, including healthcare, transportation, finance, and most recently, education. In educational settings, AI has been harnessed for adaptive learning systems, automated feedback, language translation, and notably, lesson planning. While the potential of AI in streamlining teachers' workloads and personalizing education is widely recognized (Luckin, 2016), its adoption and effectiveness are largely dependent on regional contexts, infrastructural readiness, and educators' digital competencies.

Globally, AI tools are being utilized to assist educators in various capacities. Platforms such as ChatGPT, Google's Bard, and Microsoft Copilot offer content generation, grammar

correction, and even lesson sequencing. In countries such as the United States, South Korea, and Finland, AI has been trialed in both urban and rural school districts, with promising outcomes such as increased planning efficiency and more differentiated instruction (Holmes et al., 2022; OECD, 2021). However, widespread adoption is often tempered by ethical concerns, lack of technical training, and resource limitations, particularly in less economically advantaged regions.

AI tools in lesson planning typically serve as augmentative rather than substitutive technologies. This means that while they do not replace the creative and pedagogical judgment of teachers, they enhance the efficiency and consistency of lesson design. According to Holmes et al. (2022), AI integration is most effective when embedded within a clear pedagogical framework and accompanied by ongoing professional development.

2.2 Educational Technology in Ukraine: Infrastructure and Readiness

Ukraine's integration into the digital education movement has faced unique historical and socio-political challenges. Since 2014, following the annexation of Crimea and the escalation of conflict in Eastern Ukraine, much of the country's educational infrastructure has experienced systemic stress. Despite this, the Ministry of Education and Science of Ukraine (MoESU, 2020) has made significant strides in digitizing education through initiatives such as the "New Ukrainian School" reform, launched in 2017. This reform emphasizes student-centered approaches, digital literacy, and competency-based education.

However, actual implementation at the regional level reveals disparities. A 2021 UNESCO report found that while urban schools in Kyiv, Lviv, and Dnipro had relatively stable access to digital tools and internet infrastructure, rural areas including parts of Transcarpathia lagged significantly behind in technological availability (UNESCO, 2021). This digital divide directly impacts the feasibility of AI-assisted tools in lesson planning.

Moreover, the level of digital literacy among teachers varies greatly. A national survey conducted by the Ukrainian Institute for Educational Development (UIED, 2022) revealed that only 42% of teachers considered themselves confident in using advanced educational technologies. Most were familiar with basic software such as Microsoft Word and PowerPoint

but lacked experience with AI or data-driven platforms. In Transcarpathia, anecdotal evidence from teacher training centers confirms that older teachers, particularly those in village schools, feel overwhelmed by the demands of digital transformation. Additionally, studies of in-service EFL teachers elsewhere indicate generally positive attitudes toward the potential of generative AI but only moderate overall readiness, largely due to insufficient hardware, software access, and lack of targeted training (Ozdemir, 2024).

2.3 Teachers' Perceptions and Digital Competence

Understanding the perspectives of teachers toward AI-assisted lesson planning is crucial. As Kacsó and Huszti (2024) point out, AI's ability to process and analyze large datasets enables educators to design personalized lesson plans, assess student performance in real time, and deliver immediate, data-driven feedback, precisely the kinds of efficiencies and insights that can transform English lesson planning. International studies, such as those by Zhang & Aslan (2021) and Holmes et al. (2022), suggest that while educators recognize the potential time-saving benefits of AI, they are also concerned about loss of pedagogical control, over-standardization of content, and data privacy.

In the Ukrainian context, a 2023 study conducted by the National Academy of Educational Sciences (NAES) found that only 17% of surveyed teachers reported having used AI tools like ChatGPT or AI lesson generators. Of these, the majority were English or IT teachers, and 73% reported using AI occasionally to generate example texts or grammar exercises. Their main concerns included reliability of content, potential student misuse (plagiarism), and lack of Ukrainian-language support in AI platforms (NAES, 2023).

Digital competence among teachers is a cornerstone for successful AI integration. According to the European DigCompEdu framework, digital competence encompasses six areas: professional engagement, digital resources, teaching and learning, assessment, learner empowerment, and facilitating learners' digital competence (Redecker, 2017). Applying this framework to Ukrainian teachers, it becomes clear that training must go beyond basic tool use and engage teachers in critical thinking about how to evaluate, adapt, and ethically use AI-generated materials.

In Transcarpathia, teacher interviews conducted by local educational NGOs, such as EdCamp Ukraine (2023), reflect a cautious optimism. Younger teachers, especially those trained in post-2017 institutions, are more willing to experiment with AI, while more senior educators often express distrust and a preference for analog materials. This generational divide suggests that capacity-building efforts must be differentiated and context-sensitive.

2.4 Institutional and Policy Support Structures

Successful AI integration in education, particularly in lesson planning requires more than just access to tools; it demands robust institutional frameworks and targeted policy interventions. The importance of top-down support is underscored in UNESCO's (2021) global policy guidelines, which stress that the effective use of AI in schools must be accompanied by national strategies for teacher training, ethical AI use, and technological investment.

In Ukraine, institutional support for digital innovation in education has been increasing since the implementation of the "Concept of the Development of Digital Competencies of Citizens" (OECD, 2021). This national framework identifies digital skills as core competencies for educators and students alike and has promoted the creation of resources such as the "Diia. Digital Education" platform. However, this initiative primarily focuses on foundational digital literacy rather than advanced applications such as AI-assisted pedagogy.

At the regional level, educational departments in oblasts like Lviv and Kyiv have experimented with incorporating AI and automated systems into teacher workflows, but Transcarpathia remains underserved. Interviews conducted by the Ukrainian Education Policy Center (2023) reveal that local school administrations often lack clear guidance or resources to implement digital reforms. Teachers are typically expected to find their own tools and navigate AI technologies independently, without structured support or evaluation criteria.

This lack of systemic institutional scaffolding results in fragmented and inconsistent adoption. In some schools, early adopters have begun using AI tools like ChatGPT or Canva's Magic Write to assist with lesson objectives and formative assessments, while in others, such technologies are virtually unknown or outright avoided due to perceived risks and lack of training.

Moreover, the Ukrainian Ministry of Education has yet to issue any comprehensive framework for AI usage in public education. Without such guidance, the adoption of AI is governed more by individual initiative than by structured policy, leading to ethical and practical ambiguities. For example, there are no current national guidelines on how AI-generated materials should be cited in teaching portfolios, nor are there clear rules for student use of generative AI in homework assignments (Education Profiles, 2023).

This absence of regulation mirrors early challenges in other countries. In the UK, for instance, the 2019 Selwyn report on digital learning highlighted initial resistance among teachers to AI-driven lesson planning tools due to uncertainties around data protection and educational integrity. Only after local education authorities introduced targeted training and ethics workshops did schools begin to adopt such tools more broadly and effectively (Selwyn, 2019).

Institutional inertia, combined with the rapid pace of AI development, places considerable strain on educators who must navigate these changes without adequate support. In the Transcarpathian context, building partnerships with universities and international organizations may be a viable strategy to bridge this policy gap. Initiatives such as the Erasmus+ "Digital School" project have already started piloting AI-supported learning modules in select Ukrainian regions, and their expansion into Transcarpathia could provide the necessary framework for responsible AI use.

2.5 Pedagogical and Ethical Implications of AI Integration

The pedagogical implications of AI in lesson planning are profound and multifaceted. On one hand, AI tools offer time-saving benefits by automating routine tasks such as generating lesson objectives, creating quizzes, or suggesting activities based on curricular standards. On the other hand, excessive reliance on AI risks standardization, a reduction in teacher agency, and potential misalignment with local educational values (Selwyn, 2019).

AI is only as good as the data and design upon which it is built. Most large language models, such as GPT-4 or Gemini, have been trained predominantly on English-language internet content from the Global North. This raises concerns about cultural relevance and

appropriateness in Ukrainian classrooms. For instance, a prompt asking ChatGPT to generate a lesson on “spring traditions” may yield examples rooted in American or British culture, with little acknowledgment of Ukrainian customs or regional variations, unless specifically instructed otherwise (Zhang, 2022).

Ethical considerations are also critical. AI use raises questions about authorship and intellectual honesty. A teacher who copies and pastes an AI-generated lesson plan without reviewing its pedagogical value or aligning it with student needs may be abdicating part of their professional responsibility. According to Fjeld et al. (2020), ethical AI use in education requires transparency, accountability, and a human-in-the-loop approach, where the teacher maintains full decision-making authority.

In addition, concerns around student data privacy remain largely unresolved. Some AI systems require login credentials or store user queries, raising potential risks regarding compliance with data protection laws. Ukraine’s legislation on personal data protection (Law No. 2297-VI) is still being harmonized with the European General Data Protection Regulation (GDPR), and many school administrators are unaware of how these laws apply to cloud-based educational tools.

There is also the issue of digital equity. AI-powered lesson planning tools may benefit teachers in urban schools with reliable internet and device access while excluding those in rural areas. A UNESCO (2021) study found that unequal digital access tends to deepen pre-existing educational inequalities. Thus, the uncritical promotion of AI can unintentionally exacerbate gaps in teaching quality and student achievement.

Finally, pedagogical training must evolve to include AI literacy. According to Mishra and Koehler’s (2006) TPACK framework (Technological, Pedagogical, and Content Knowledge), effective teaching with technology requires the integration of all three domains. Most Ukrainian teacher training programs still emphasize pedagogical and content knowledge, with minimal exposure to the technological dimension especially where AI is concerned.

Educators should be equipped not only to use AI tools but also to critically evaluate their outputs. This includes checking for bias, factual errors, or misalignment with student needs. As Wiliam (2018) points out, formative assessment and feedback are most effective when personalized and context-sensitive - something AI can support but not replace without active teacher oversight.

2.6 Comparative Case Studies and Best Practices

To illustrate how AI-assisted lesson planning can function in practice, it is useful to examine comparative case studies from other educational contexts and draw lessons applicable to Transcarpathia. Three representative cases, one from a high-income country, one from a middle-income country, and one from a peer post-Soviet context - highlight both possibilities and pitfalls.

Case Study A: Adaptive Lesson Planning in Singapore

Singapore's Ministry of Education has invested heavily in AI research for education, partnering with local universities and EdTech firms. One notable project is the INTELLITASK system, an AI-driven lesson planning assistant co-developed by the National Institute of Education and a private partner. The system allows teachers to input curriculum standards, class profiles, and desired learning outcomes; it then generates a draft lesson plan, including suggested activities, formative assessment items, and resource links. Teachers report that INTELLITASK reduces planning time by up to 30%, enabling them to focus more on student engagement and differentiation (Ng, Tan, & Lim, 2023).

Key success factors in Singapore include:

Strong Infrastructure: Nearly 100% of classrooms have high-speed internet, interactive whiteboards, and school-issued tablets for teachers and students.

Dedicated AI Training: Pre-service teacher education includes modules on AI in pedagogy, and in-service PD offers hands-on workshops.

Iterative Feedback Loops: Teachers provide continuous feedback on AI outputs, which is used by developers to refine and localize the system.

Notes for Transcarpathia:

Localization is Essential: AI systems must be trained or tuned on local curricula and cultural contexts. Without that, AI-generated content may be irrelevant or inappropriate.

Feedback Mechanisms: Establishing channels for teacher feedback ensures that AI tools evolve in ways that genuinely support classroom needs.

Case Study B: Teacher - AI Collaboration in Chile

In Chile, the ProFuturo program, an initiative led by Fundación Telefónica and UNESCO has rolled out an AI-enabled platform in select rural and peri-urban schools. The platform offers a suite of AI tools: automated test generators, reading comprehension question creators, and multimedia content suggestions. Teachers using ProFuturo receive tablets pre-loaded with the platform, offline modules for low-connectivity contexts, and access to AI-driven analytics that highlight student progress and conceptual misunderstandings (Vega & Rojas, 2022).

Outcomes reported include:

Improved Lesson Differentiation: Teachers personalize worksheets rapidly for students at varying proficiency levels.

Analytic Insights: AI dashboards highlight which students struggle with particular grammar constructs, allowing targeted small-group interventions.

Increased Teacher Confidence: With scaffolded AI support, teachers express greater willingness to experiment with new pedagogical approaches.

Key success factors:

Offline Functionality: Given connectivity challenges, offline AI modules ensure continuity of use in areas with intermittent Internet.

Contextual Training: Teachers receive training not only in tool use but also in interpreting AI analytics for pedagogical decision-making.

Lessons for Transcarpathia:

Hybrid Deployment Models: Offline or low-bandwidth versions of AI tools are critical for rural schools with unstable connectivity.

Data Interpretation Workshops: Training must include how to read AI-generated analytics meaningfully to guide instruction.

Case Study C: AI in Lesson Planning in Estonia

Estonia, celebrated for its digital government and e-school system, has piloted AI assistants in secondary schools to aid lesson design. The eKool AI Tutor, integrated into the national e-school platform, suggests lesson outlines based on the national curriculum database and previous lesson records. Pilots in 2023 involved 50 English teachers across urban and rural schools. Preliminary findings indicate that while the AI tutor expedites lesson drafting, teachers are cautious about adopting AI suggestions without substantive review (Pärtel & Kask, 2024).

Critical observations:

Teacher Autonomy Maintained: The AI tutor provides optional suggestions; final lesson approval remains wholly with the teacher.

Curriculum Integration: AI accesses an up-to-date curriculum repository, ensuring alignment with national standards.

Ethical Oversight: The Estonian Education Ministry established an AI ethics committee to review tool design and usage protocols.

Lessons for Transcarpathia:

Optional Integration: Framing AI as an ‘assistant’ rather than an authoritative planner preserves teacher agency.

Ethics Committees: Local oversight bodies can help address concerns around data privacy, bias, and pedagogical appropriateness.

Synthesis of Best Practices

Drawing from these cases and others in the literature (Holmes et al., Bialik, & Fadel, 2022; Luckin, Holmes, Griffiths, & Forcier, 2016; UNESCO, 2021), several best practices emerge for AI-assisted lesson planning:

1. Local Contextualization

   AI systems must reflect national or regional curricula, cultural norms, and language specifics to be pedagogically useful.
2. Robust Infrastructure Planning

   Investment in reliable internet, devices, and power supply is foundational; hybrid offline-capable tools can mitigate connectivity gaps.
3. Comprehensive Professional Development

   PD should cover tool mechanics, data literacy (interpreting analytics), ethical considerations, and content validation.
4. Iterative, Teacher-Driven Feedback Loops

   Teachers’ insights should inform ongoing AI tool refinement, ensuring responsiveness to classroom realities.
5. Ethical and Regulatory Frameworks

   Clear guidelines on data privacy, student consent, AI transparency, and academic integrity are essential to build trust and accountability.

PART III Empirical Research on AI Use in Lesson Planning

3.1 Methodology

A questionnaire was administered during the research consisting of 16 questions, combining demographic, multiple-choice, and open-ended formats to capture a holistic view of AI adoption. Administered in Hungarian via Google Forms to ensure accessibility, it targeted 25 secondary English teachers in Transcarpathia. Data collection spanned an extended period to accommodate regional connectivity challenges, ensuring inclusivity. Quantitative analysis involved calculating frequencies, percentages, and ordinal scores, with cross-tabulation against demographic data. Qualitative responses were thematically analyzed to identify recurring patterns and unique perspectives. This mixed-methods approach provides a robust foundation for the detailed breakdown that follows.

3.2 Participants

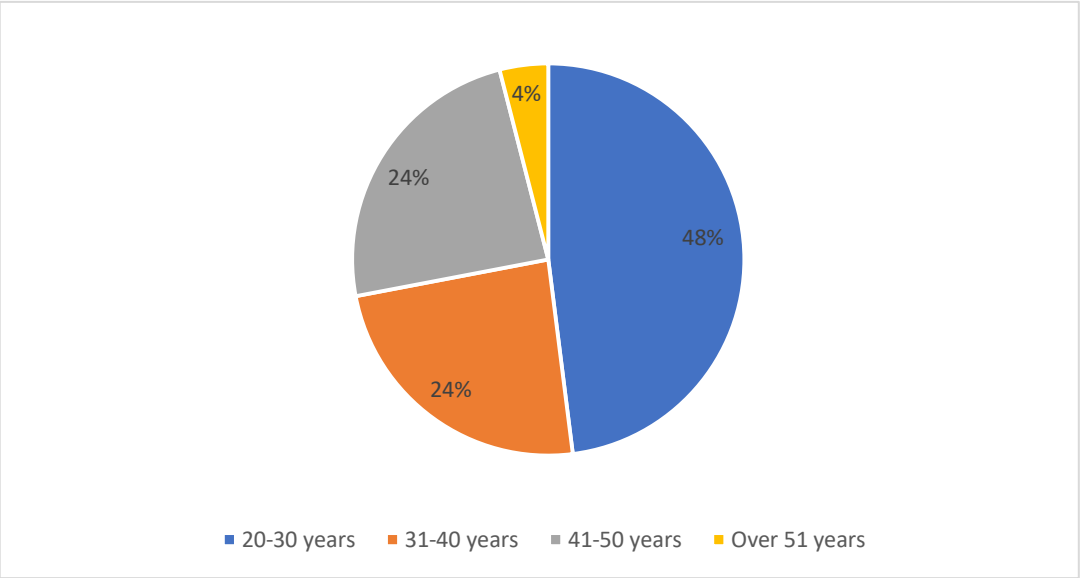
The integration of artificial intelligence (AI) into educational practices, particularly lesson planning, presents a transformative opportunity for secondary English teachers in Transcarpathia, Ukraine. This comprehensive analysis explores the responses from a questionnaire administered to 25 teachers, providing an in-depth examination of their experiences, perceptions, and challenges with AI-assisted lesson planning. Each of the 16 questions is meticulously analyzed, incorporating demographic patterns, qualitative insights, cross-question correlations, and practical implications tailored to the region's unique context. The goal is to offer actionable recommendations for educators, administrators, and policymakers, contributing to the broader thesis objective of evaluating AI’s role in enhancing English Language Teaching (ELT).

3.3 Research Findings

The first question establishes the demographic profile of the respondents, setting the stage for understanding AI adoption patterns across age groups. The sample skews younger, with 48% of respondents aged 20-30 (Diagram 3.3.1). This age group is likely more familiar with digital tools due to recent exposure during their education or early careers. The 41-50 age group (24%)

represents mid-career teachers who may balance traditional and modern teaching methods, while the 31-40 group (24%) reflects a transitional cohort. The single respondent aged 51+ (4%) limits insights into older educators, who may face greater barriers to AI adoption due to less experience with technology.

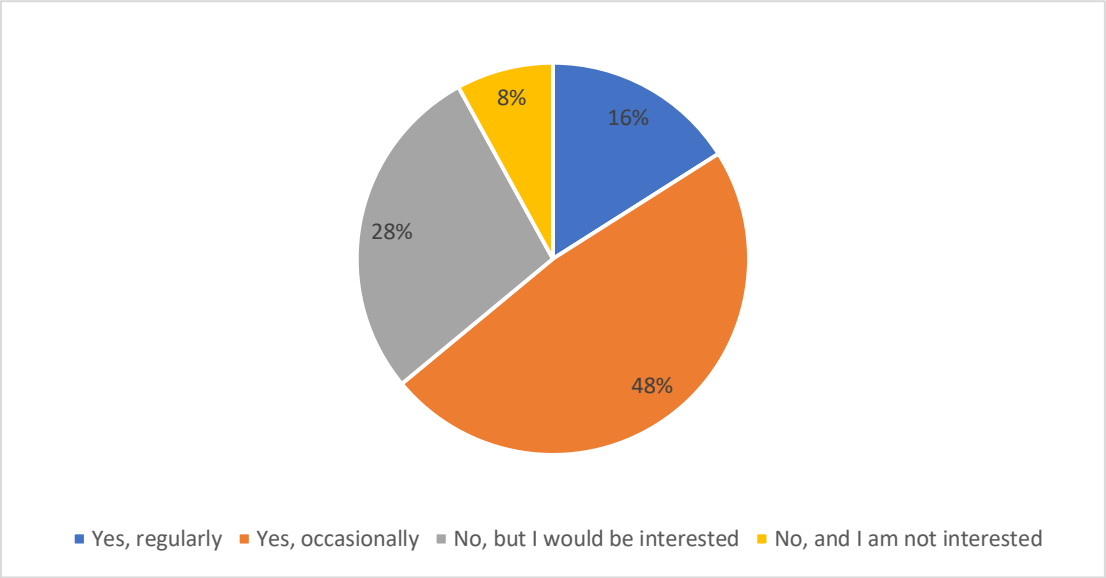
Diagram 3.3.1 Age of the participants



The second question builds on the age profile by examining teaching experience within the sample, helping to contextualize AI adoption relative to career stage. Among the respondents, 44% reported less than 5 years of teaching experience, which corresponds closely with the 20–30 age group, suggesting that many of them may be recent entrants to the profession. Additionally, 24% of participants have more than 20 years of experience, indicating the presence of more experienced educators in the sample who may be more accustomed to traditional teaching methods. The groups with 11–20 years (20%) and 5–10 years (12%) of experience represent transitional career stages, which within this sample may include teachers who are open to pedagogical innovation but may not yet have fully integrated digital technologies into their practice.

The upcoming question shifts focus to general AI use in education, providing a baseline for understanding broader tech adoption. Occasional use (48%) is the most common response, spanning all age groups but led by 20-30-year-olds (Diagram 3.3.2). Regular use (16%) is concentrated among teachers under 40, while the single “not interested” response comes from the 51+ teacher. This suggests that age significantly influences AI engagement, with younger teachers more likely to experiment with or rely on AI tools.

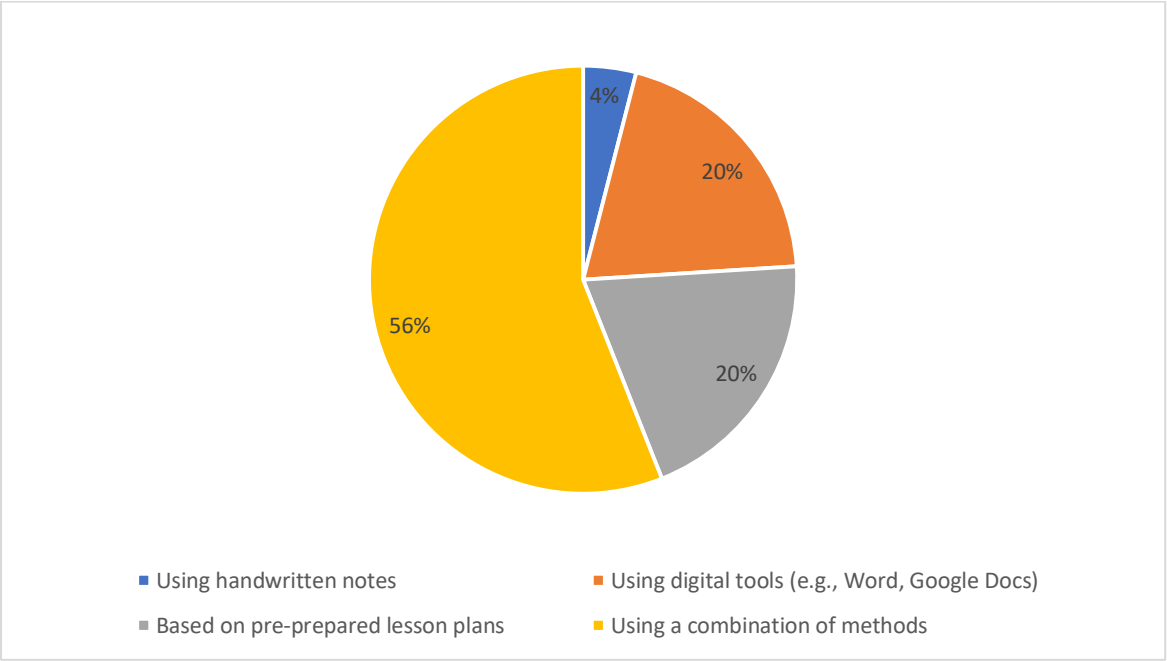
Diagram 3.3.2 General Use of AI in Education



The fourth question explores current lesson planning methods, setting the context for AI’s potential integration into existing workflows (Diagram 3.3.3). Combined methods (56%) reflect adaptability, blending digital and analog approaches. Digital tools (20%) indicate tech reliance, while pre-prepared plans (20%) suggest efficiency-seeking teachers. Handwritten notes (4%) are a rare traditional holdout.

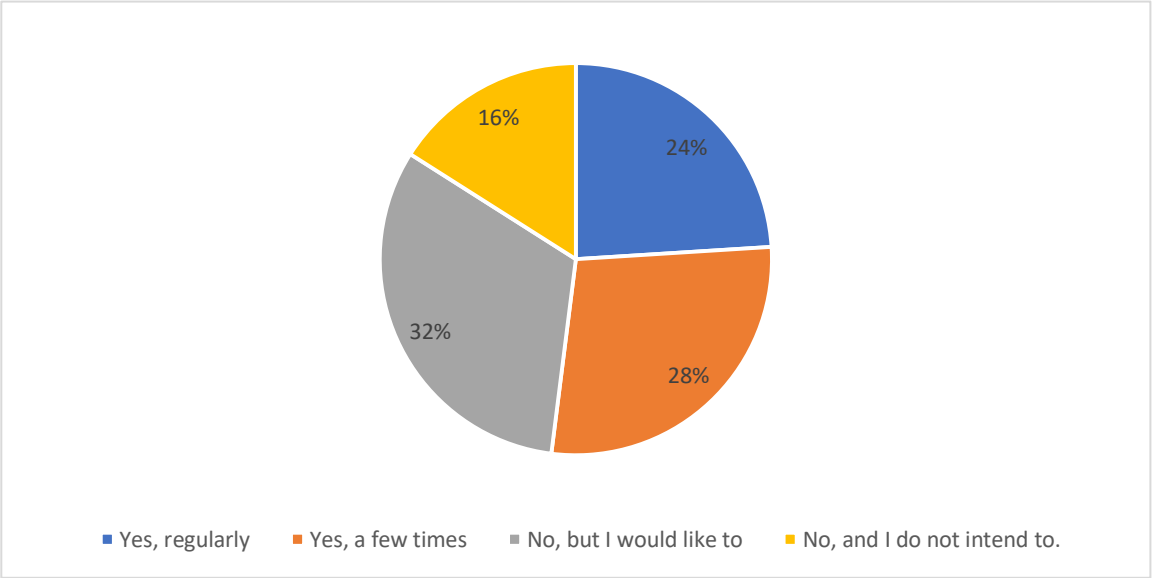
Younger teachers (20-30) favor digital tools , aligning with tech comfort. Experienced teachers (>20 years) dominate pre-prepared plans, valuing familiarity. Combined methods span all ages, showing versatility.

Diagram 3.3.3 Lesson Planning Methods



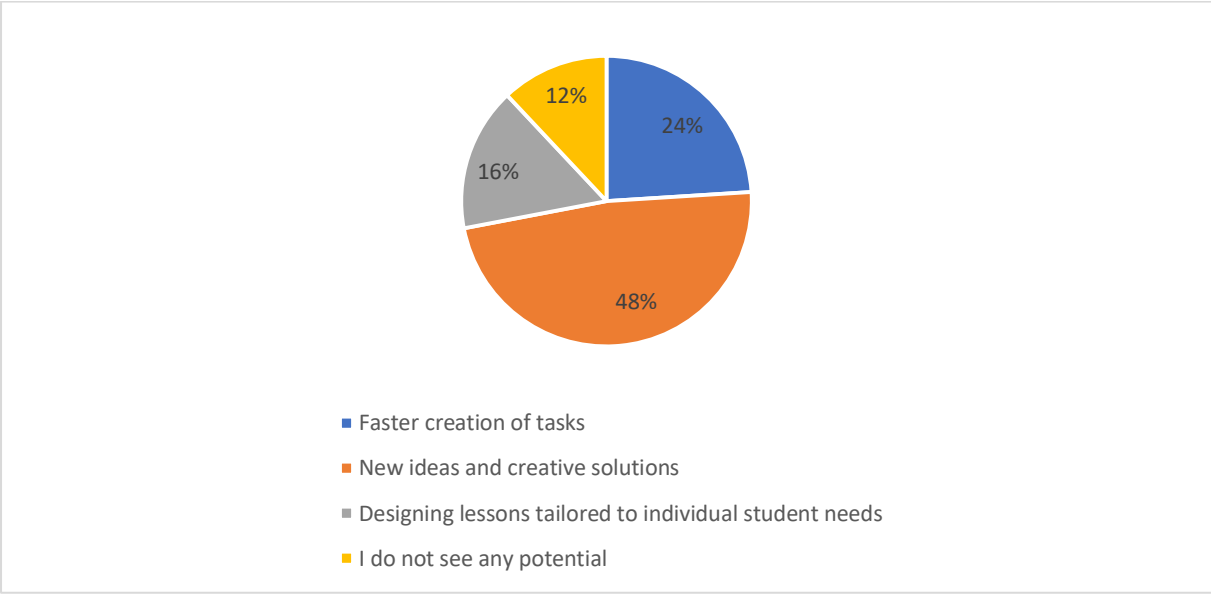
The fifth question clarified teachers' specific engagement with AI for lesson planning, narrowing the focus to practical application. Interest (32%) outpaces use, showing potential for growth. Occasional (28%) and regular (24%) use suggest varying commitment, while resistance (16%) highlights skepticism (Diagram 3.3.4). Regular use is exclusive to 20-30-year-olds, reflecting tech enthusiasm. Interest peaks in 31-40, showing mid-career curiosity. Resistance is experienced teacher-heavy (41-50, 51+), tied to experience.

Diagram 3.3.4 AI Use for Lesson Planning



The following question focuses on perceived benefits of AI in lesson planning, incorporating an additional handwritten response to enrich the analysis. Creativity remains the leading perceived benefit (48%), reflecting a strong desire for innovative lesson ideas that engage students in Transcarpathia's multilingual classrooms. Efficiency (24%) appeals to teachers seeking to streamline planning, while personalization (16%) addresses diverse student needs. The "no potential" group (12%) represents skeptics, presumably satisfied with traditional methods (Diagram 3.3.5).

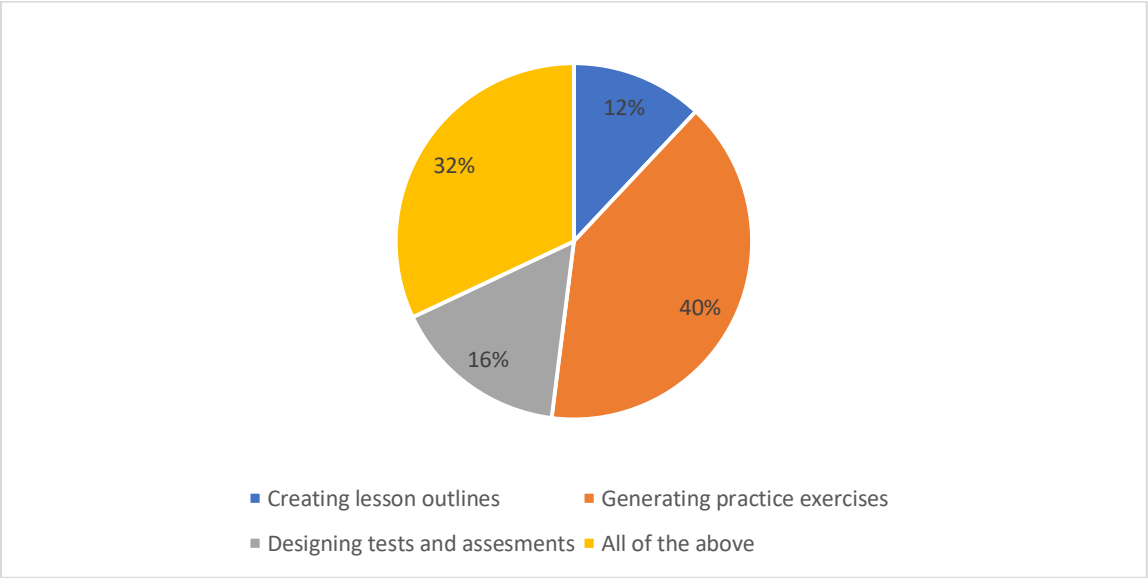
Diagram 3.3.5 Benefits of Using AI in Lesson Planning



The seventh question delves into specific lesson planning tasks that teachers in the sample would delegate to AI, revealing their practical expectations. Preferences for “all tasks” (32%) and “practice tasks” (40%) suggest varying needs within the group from comprehensive planning support to assistance with specific classroom activities. Test creation (16%) and lesson outlines (12%) reflect more targeted uses (Diagram 3.3.6).

Among the respondents, younger teachers showed a tendency to prefer “all tasks,” possibly reflecting openness to AI’s full potential. More experienced participants leaned toward delegating practice tasks, potentially indicating a preference for simpler, supportive functions. Teachers in mid-career stages were more evenly distributed across test and outline options, suggesting a pragmatic and selective approach to AI use in planning.

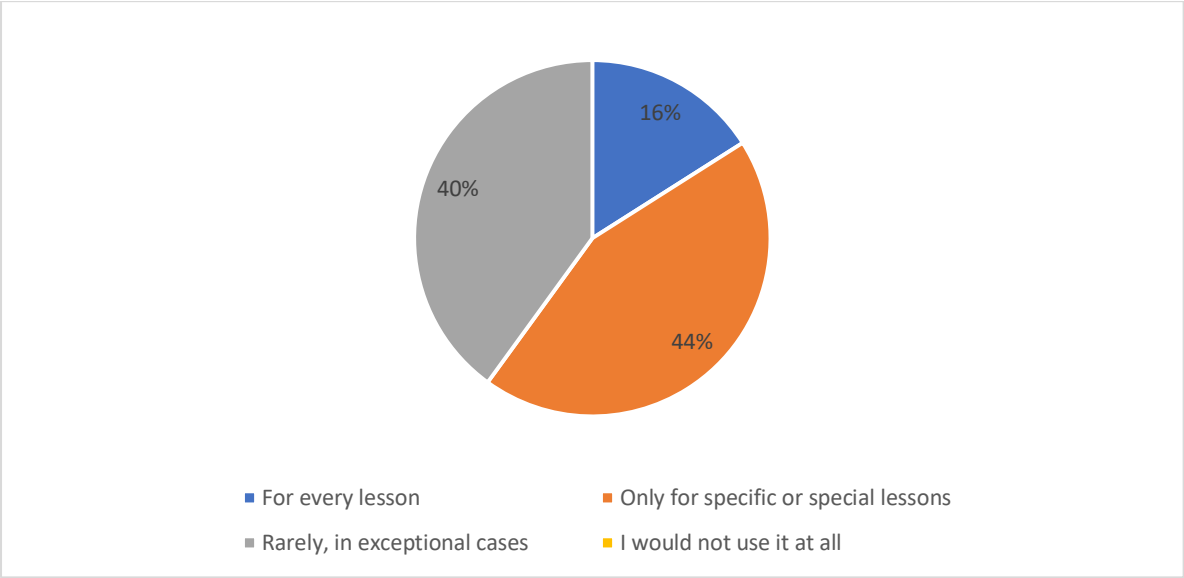
Diagram 3.3.6 Preferred AI Tasks for Lesson Planning



The upcoming question gauges teachers' overall perceptions of AI tools, revealing attitudes toward their utility and limitations. Mixed positivity dominates, with 40% seeing utility but wanting refinements and 32% fully endorsing AI's value. Accuracy concerns (20%) highlight technical limitations, while 8% deem AI unnecessary, reflecting traditionalist views. "Very useful" is driven by younger teachers, reflecting tech enthusiasm. Accuracy concerns are veteran-heavy, tied to experience with inconsistent outputs. Mid-career teachers balance optimism and critique, while "unnecessary" includes the 51+ teacher.

The ninth question addresses the desired frequency of AI use in lesson planning, offering insight into how comfortable teachers in the sample are with regular versus selective integration. Selective use dominates the responses, with 44% choosing "some lessons" and 40% selecting "rarely," suggesting a cautious and context-dependent approach (Diagram 3.3.7). Daily use, reported by 16% of respondents, reflects a small group open to full integration, possibly due to higher confidence in AI's utility and reliability. In this sample, daily use is reported exclusively by younger teachers, which may align with greater digital fluency. Selective use spans all age groups, while those with more experience tend to choose "rarely," potentially reflecting a more measured or skeptical stance toward AI in education.

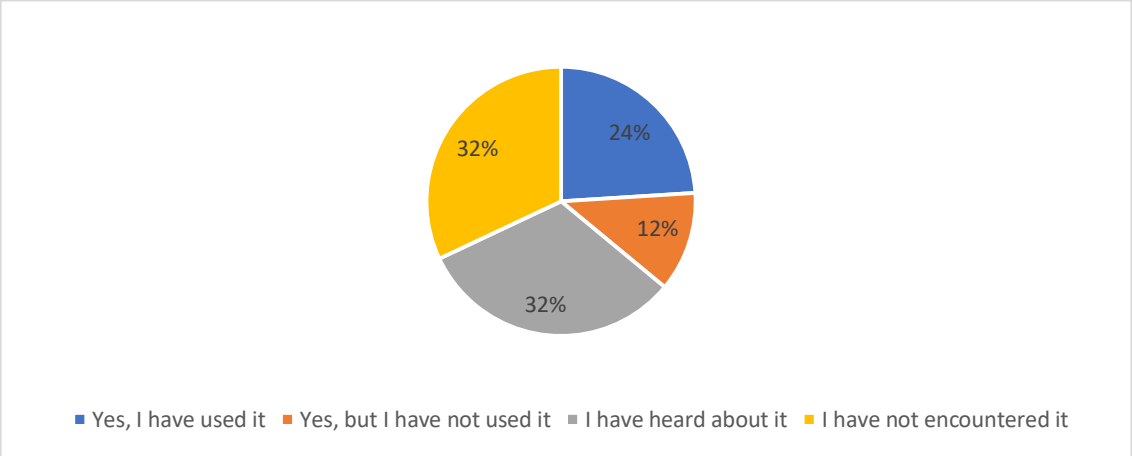
Diagram 3.3.7 Desired Frequency of AI Use



The tenth question broadens the scope, exploring AI's potential across various educational functions beyond lesson planning. Broad optimism (56%) sees AI as a versatile educational tool, capable of supporting multiple areas like planning, grading, and student engagement. Specific preferences for practice materials (24%) and writing skills (12%) reflect targeted needs, while communication tasks (8%) are a niche interest.

The eleventh question investigates exposure to AI-based lesson planning tools, emphasizing awareness as a key step toward eventual adoption. Limited exposure (32%) may represent a substantial barrier to AI integration, pointing to the need for more professional development and information sharing. Another 32% reported awareness without use, which could reflect initial curiosity or uncertainty. Actual use was noted by 24% of respondents, indicating the presence of early adopters within the group. The remaining 12%, who are aware of AI but have never used it, may hesitate due to concerns such as time constraints or trust in the technology (Diagram 3.3.8).

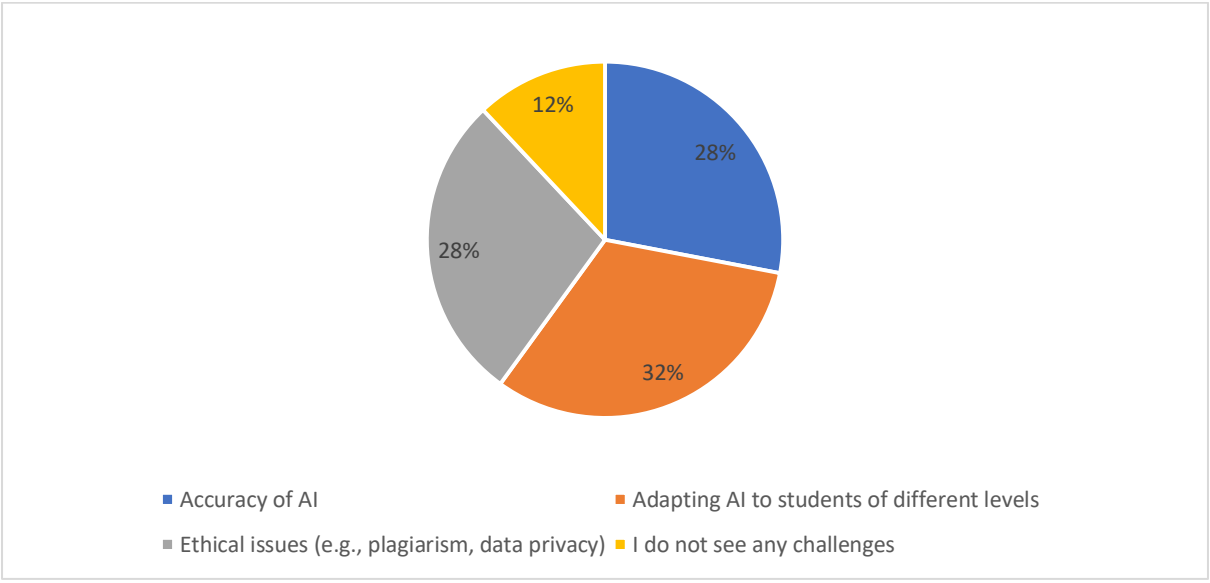
Diagram 3.3.8 Awareness and Use of AI Lesson Planning Tools



The twelfth question probes perceived barriers to AI adoption, helping to identify the main obstacles teachers in the sample associate with integration. Adaptation challenges (28%) and ethical concerns (32%) emerge as the most frequently cited issues, reflecting both practical difficulties and broader moral considerations. Accuracy-related concerns (28%) further highlight perceived limitations in AI's reliability. A minority (12%) reported no challenges, which may suggest a more optimistic or confident stance toward AI (Diagram 3.3.9).

Among the respondents, concerns about adaptation were particularly common among younger teachers, possibly due to heightened sensitivity to student diversity and instructional alignment. Ethical concerns were reported across all age groups, indicating their wide relevance. Accuracy issues appeared more frequently among experienced teachers, who may be more critical of technological precision. Notably, the "no challenges" responses were predominantly from younger participants, which could reflect greater trust in digital tools or stronger digital competence.

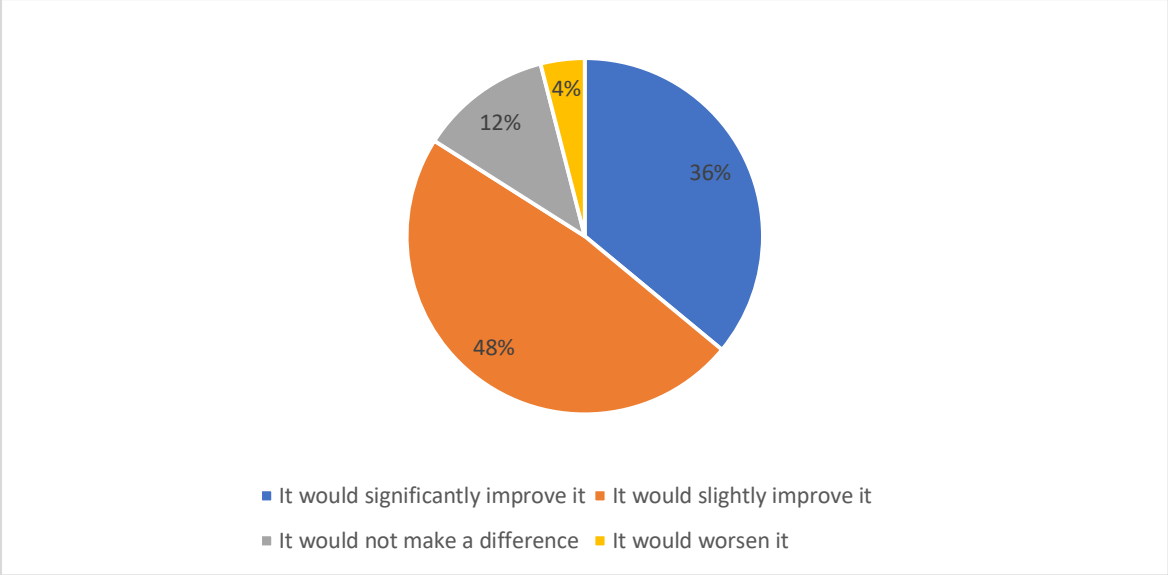
Diagram 3.3.9 Perceived Barriers to AI Adoption in Lesson Planning



The following question explores long-term attitudes toward AI's role in education, gauging future openness. Cautious support (56%) for targeted AI use leads, reflecting a desire for controlled integration. Uncertainty (20%) suggests a need for more evidence, while "definitely" (16%) and "no" (8%) represent polarized views of full adoption or rejection. "Certain areas" spans all ages, showing broad but selective support. Uncertainty peaks among mid-career teachers, reflecting transitional caution. "Definitely" is young, tied to tech enthusiasm.

The fourteenth question assesses expectations for AI's impact on lesson quality, offering insight into how teachers in the sample perceive the value of AI integration. Moderate optimism dominates the responses, with 48% expecting incremental improvements in lesson quality. Significant improvement is anticipated by 36%, suggesting a substantial portion of respondents are hopeful about AI's transformative potential. Meanwhile, 12% foresee no change, and 4% believe lesson quality may worsen, potentially due to concerns about depersonalization or excessive standardization (Diagram 3.3.10).

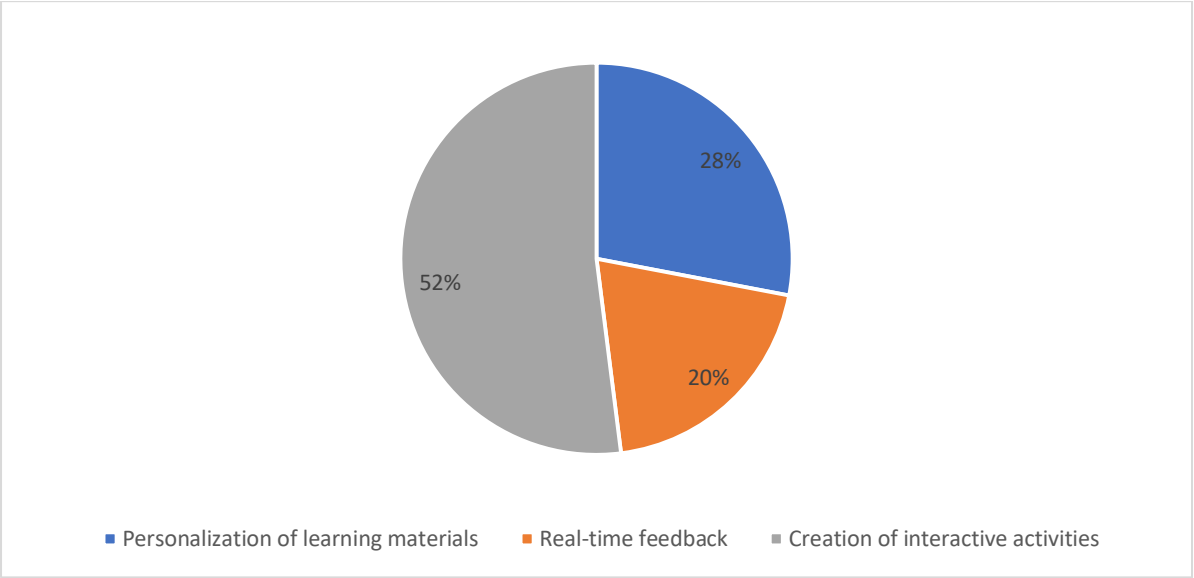
Diagram 3.3.10 Expectations for AI's Impact on Lesson Quality



The fifteenth question evaluates AI's perceived efficiency, which is a critical factor in influencing its adoption for lesson planning. Among respondents, 48% anticipated considerable time savings from AI use, indicating strong expectations for increased efficiency. Another 32% expected moderate savings, suggesting a more measured or realistic outlook. In contrast, 16% anticipated only minimal benefits in terms of time, while 4% believed AI would actually increase their workload possibly due to anticipated editing demands or a lack of trust in AI-generated content

The final question explores which AI features respondents would most like to see in lesson planning tools, offering insight into user priorities and informing potential tool development. Interactivity emerged as the most frequently selected feature (52%), which may reflect a strong interest in student-centered activities such as games or quizzes. Personalization followed with 28%, suggesting a desire to tailor content to individual student needs. Real-time feedback was chosen by 20% of participants, indicating interest in tools that provide dynamic planning support or allow for immediate instructional adjustments (Diagram 3.3.11).

Diagram 3.3.11 Desired AI Features in Lesson Planning Tools



3.4 Discussion of Results

The questionnaire responses from 25 secondary English teachers in Transcarpathia provide critical insights into the adoption of AI-supported lesson planning, revealing a landscape of cautious optimism, limited implementation, and systemic challenges

Three questions were set before writing the work, which awaited answers:

What are Transcarpathian English teachers' attitudes towards AI-supported lesson planning?

Transcarpathian teachers exhibit a predominantly positive yet cautious attitude toward AI-supported lesson planning, shaped by generational differences. A significant 18 participants (72%) view AI tools as useful, with younger teachers (aged 20–30, 10 participants, 40%) expressing the strongest enthusiasm, valuing AI's potential to enhance creativity and lesson quality in multilingual classrooms. In contrast, seasoned educators (aged 41–50 and 51+, 7 participants, 28%) are more reserved, with 4 participants (16%) citing concerns about output accuracy and 2 participants (8%) deeming AI unnecessary, reflecting a preference for established pedagogical approaches. The absence of outright rejection (0 participants, 0%

unwilling to use AI) indicates broad openness, particularly when tools are perceived as user-friendly and relevant to Transcarpathia's diverse student needs. This optimism, tempered by concerns about usability and contextual fit, aligns with global discussions on balancing technological innovation

To what extent are AI tools currently used in lesson planning in this region?

AI use in lesson planning remains limited in Transcarpathia, with adoption concentrated among younger teachers but constrained by systemic barriers. Only 11 participants (44%) have engaged with AI tools, with 5 (20%) using them regularly and 6 (24%) occasionally, all from the younger cohort (20–30). Meanwhile, 8 participants (32%) are interested but have not used AI, and 3 (12%) have no plans to, primarily seasoned educators. A notable 10 participants (40%), mostly aged 41–50 or 51+, report no exposure to AI tools, highlighting significant access and training gaps.

Teachers' adaptability, evidenced by the widespread use of combined digital and traditional planning methods (12 participants, 48%), suggests potential for broader AI integration if barriers are addressed. The preference for targeted applications, such as generating practice tasks (10 participants, 40%), indicates that AI is seen as a supplementary tool within ELT's reflective planning framework.

What perceived benefits, barriers, and training needs do teachers associate with AI use?

Teachers identify creativity, efficiency, and personalization as key benefits of AI in lesson planning. Ten participants (40%) value AI for generating creative tasks, addressing the need for engaging, multilingual lessons in Transcarpathia's diverse classrooms. Efficiency is a significant draw, with 12 participants (48%) anticipating substantial time savings, enabling greater focus on student interaction.

The primary barriers include challenges in adapting AI outputs to student needs (7 participants, 28%), ethical concerns regarding plagiarism and data privacy (6 participants, 24%), and accuracy issues (4 participants, 16%). Ethical and accuracy concerns necessitate robust guidelines to ensure trust, echoing global calls for ethical AI frameworks. Infrastructural

limitations, evident in the 10 participants (40%) with no AI exposure, include inadequate connectivity and hardware, further hindering adoption.

Training should focus on practical applications, such as creating interactive tasks (14 participants, 56%), and address ethical considerations. Hybrid AI tools with offline capabilities, inspired by global initiatives, are essential for Transcarpathia's connectivity challenges.

H1: Teachers with higher digital competence and fewer years of teaching experience are more likely to adopt AI-supported lesson planning tools.

This hypothesis is supported. Younger teachers (10 participants, 40%), with fewer years of experience (10 participants, 40% with less than 5 years) and presumed higher digital competence, lead AI adoption, with 5 participants (20%) using AI regularly and expressing positive attitudes. Seasoned educators, with more extensive experience (7 participants, 28% with 11–20 years or more), show greater caution, with 3 participants (12%) having no plans to use AI and 5 (20%) reporting no exposure.

H2: Perceived usefulness and ease of use strongly influence willingness to implement AI tools in the classroom.

This hypothesis is supported. The universal openness to AI (0 participants, 0% rejecting use) and the strong correlation between perceived usefulness (18 participants, 72% finding AI useful) and willingness to adopt it confirm that usability and relevance are critical drivers. However, concerns about accuracy and adaptability temper enthusiasm, suggesting that ease of use is a pivotal factor in Transcarpathia's resource-constrained environment.

H3: Institutional support and training significantly affect actual integration levels of AI in pedagogical planning.

This hypothesis is strongly supported. Limited adoption (11 participants, 44%) and significant non-exposure (10 participants, 40%) highlight the critical role of institutional support. Infrastructural barriers, including unreliable internet and limited hardware, and the lack of training, particularly for seasoned educators, hinder integration. Teachers' adaptability and

interest (8 participants, 32% interested but non-using) suggest that enhanced support, such as professional development and access to context-specific tools, could significantly increase AI use.

CONCLUSIONS AND PEDAGOGICAL IMPLICATIONS

This study investigated the integration of artificial intelligence (AI) in English lesson planning among secondary school teachers in Transcarpathia, a region marked by linguistic diversity and ongoing challenges in digital infrastructure. Using a mixed-methods approach, the research assessed the current state of AI adoption, examined teachers' perceptions, and identified the primary enablers and barriers to implementation.

The findings indicate that while the use of AI tools is still limited, there is considerable interest in their potential. Many teachers, particularly those in the early stages of their careers, viewed AI as a promising support for generating creative content and streamlining their lesson planning processes. In contrast, more experienced educators expressed reservations, often related to concerns about the accuracy, contextual appropriateness, and ethical implications of AI use. Nonetheless, the overall attitude was not one of resistance but of cautious engagement, suggesting that with appropriate support and guidance, broader adoption is possible.

The level of current AI usage remains modest. Only a small proportion of teachers reported regular use, primarily for generating practice tasks or ideas. However, a significant number expressed curiosity and a willingness to adopt such tools in the future. This reflects not a lack of interest but rather the impact of persistent systemic challenges - including unreliable internet access, limited digital resources, and a general lack of exposure to AI-based educational tools.

Teachers identified several potential benefits of AI in lesson planning, including increased efficiency, better personalization, and the ability to meet diverse student needs. At the same time, they noted important obstacles, such as the need to adapt AI-generated content, limited training opportunities, and ethical concerns surrounding data privacy and plagiarism. These insights point to the importance of localized, offline-capable AI tools and targeted professional development that addresses both practical application and responsible use.

The data also supported all three hypotheses guiding the study. It confirmed that younger, digitally competent teachers are more likely to adopt AI tools; that perceived usefulness and ease of use significantly influence willingness to engage with these technologies; and that the

presence or absence of institutional support and training plays a decisive role in actual implementation. Based on these conclusions, it is clear that AI integration in lesson planning depends not only on teacher attitudes but also on the systems surrounding them.

To realize AI's potential equitably, the following pedagogical implications should guide its integration in Transcarpathia. First, professional development programs should be implemented, focusing on practical AI applications, such as creating interactive tasks, and addressing ethical considerations to build confidence, particularly among seasoned educators. These programs should be accessible despite connectivity challenges, using in-person and asynchronous formats. Second, culturally responsive AI tools should be developed, supporting local languages like Ukrainian or Hungarian with personalization features and offline capabilities to ensure accessibility in areas with unreliable internet. Third, infrastructural enhancements, including reliable internet and modern devices, are essential to enable consistent access to AI tools across schools. Fourth, a teacher-centered integration model should be adopted, designing AI as a collaborative aid that aligns with existing planning practices, supporting gradual adoption while preserving teacher agency. Finally, ethical policies must be established to address concerns about plagiarism and privacy, fostering trust and ensuring responsible AI use.

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SUMMARY IN UKRAINIAN

Дослідження має на меті оцінити поточний стан використання ШІ у плануванні уроків, проаналізувати ставлення вчителів до цих технологій, визначити їхні переваги, виклики та потреби у професійному розвитку. Робота використовує змішаний методологічний підхід, поєднуючи кількісні та якісні дані, отримані через анкетування вчителів англійської мови, що забезпечує всебічний аналіз їхніх досвідів і перспектив.

Результати свідчать про обережний оптимізм серед закарпатських вчителів щодо впровадження ШІ у педагогічну практику. Молодші педагоги, які зазвичай мають більшу цифрову компетентність, активно використовують ШІ для створення креативних та інтерактивних навчальних матеріалів, що сприяють залученню учнів у багатонаціональних класах. Вони цінують здатність ШІ економити час, пропонувати нові ідеї для уроків і адаптувати матеріали до індивідуальних потреб учнів. Натомість досвідченіші вчителі висловлюють сумніви щодо надійності ШІ, його здатності враховувати культурні особливості регіону та відповідність місцевим навчальним програмам. Вони часто віддають перевагу традиційним методам планування, побоюючись, що автоматизовані інструменти можуть спростити педагогічний процес або відірвати уроки від реальних потреб учнів.

Використання ШІ у плануванні уроків на Закарпатті залишається обмеженим через низку системних бар'єрів. Нестабільне інтернет-з'єднання, особливо в сільських школах, ускладнює доступ до онлайн-інструментів ШІ. Брак сучасних пристроїв та недостатній рівень підготовки вчителів до роботи з передовими технологіями також стримують інтеграцію ШІ. Крім того, вчителі висловлюють етичні занепокоєння, пов'язані з можливим плагіатом, захистом даних учнів і ризиком надмірної стандартизації навчального контенту. Водночас педагоги визнають потенціал ШІ у підвищенні ефективності планування, створенні персоналізованих завдань і розвитку інтерактивних форм навчання, таких як навчальні ігри чи тести, що особливо цінно для різномовних класів.

На основі отриманих даних пропонуються рекомендації для ефективної та справедливої інтеграції ШІ у викладання англійської мови на Закарпатті. По-перше, необхідно розробити програми професійного розвитку, які навчатимуть вчителів практичному застосуванню ШІ, наприклад, створенню інтерактивних завдань, а також розглядатимуть етичні аспекти використання технологій. Такі програми мають бути доступними як офлайн, так і в асинхронному форматі, щоб врахувати інфраструктурні обмеження. По-друге, слід створювати культурно адаптовані ШІ-інструменти, що підтримують місцеві мови, зокрема угорську та українську, і пропонують офлайн-функціонал для використання в умовах нестабільного інтернету. По-третє, необхідно інвестувати в інфраструктуру, зокрема в надійне інтернет-з'єднання та сучасні пристрої, щоб забезпечити рівний доступ до технологій у міських і сільських школах. По-четверте, модель інтеграції ШІ має бути орієнтованою на вчителя, позиціонуючи технології як допоміжний інструмент, що доповнює, а не замінює педагогічну експертизу, зберігаючи автономію вчителя.

Ці заходи дозволять реалізувати потенціал ШІ для підвищення якості освіти на Закарпатті, створюючи інклюзивні, інтерактивні та персоналізовані навчальні середовища, що враховують культурне та лінгвістичне розмаїття регіону. Дослідження підкреслює, що ШІ має слугувати як партнер вчителя, а не заміна людської творчості та педагогічного досвіду, сприяючи створенню сучасної, справедливої та ефективної системи освіти.

APPENDIX

Survey questionnaire on AI-supported lesson planning by secondary school teachers in Transcarpathia.

Dear Respondent,

My name is Patrik Kacsó, and I am a fourth-year English major at the Ferenc Rákóczi II Transcarpathian Hungarian College. As part of my final year of study, I am writing a thesis on the topic of AI-supported lesson planning by secondary school teachers in Transcarpathia.The aim of my research is to explore teachers' habits and opinions regarding lesson planning assisted by artificial intelligence.

All data will be collected anonymously, and you will not be asked to provide any personally identifiable information. The responses and data will be used exclusively for research purposes.

Thank you in advance for participating in the research!

What is your age group?

- 20–30 years
- 31–40 years
- 41–50 years
- Over 51 years

How many years have you been teaching?

- Less than 5 years
- 5–10 years
- 11–20 years
- More than 20 years

Have you used Artificial Intelligence (AI)-assisted tools in education?

- Yes, regularly
- Yes, occasionally
- No, but I would be interested
- No, and I am not interested

How do you usually plan your lessons?

- Using handwritten notes
- Using digital tools (e.g., Word, Google Docs)
- Based on pre-prepared lesson plans
- Using a combination of methods
- Other: _____

Have you ever used Artificial Intelligence (AI) (e.g., ChatGPT, Gemini, MagicSchool) for lesson planning?

- Yes, regularly
- Yes, a few times
- No, but I would like to
- No, and I do not intend to

What potential do you see in using AI for lesson planning?

- Faster creation of tasks
- New ideas and creative solutions
- Designing lessons tailored to individual student needs
- I do not see any potential
- Other: _____

For which types of lesson planning tasks would you use AI?

- Creating lesson outlines
- Generating practice exercises
- Designing tests and assessments
- All of the above
- Other: _____

What is your opinion on AI-supported lesson planning tools?

- Very useful
- Useful, but need improvement
- Not accurate enough
- Unnecessary

How often would you use AI for lesson planning if it were available?

- For every lesson
- Only for specific or special lessons
- Rarely, in exceptional cases
- I would not use it at all

In your opinion, how could AI support education?

- In practicing and reviewing learning materials
- In compiling communication tasks
- In developing writing skills
- All of the above
- Other: _____

Have you encountered any lesson planning software that uses Artificial Intelligence?

- Yes, I have used it
- Yes, but I have not used it
- I have heard about it
- I have not encountered it

What challenges do you see in using AI in education?

- Accuracy of AI
- Adapting AI to students of different levels
- Ethical issues (e.g., plagiarism, data privacy)
- I do not see any challenges
- Other: _____

Would you like AI to play a more active role in education in the future?

- Yes, definitely
- Yes, but only in certain areas
- I'm not sure
- No

To what extent do you think AI could improve the quality of lesson planning?

- It would significantly improve it
- It would slightly improve it
- It would not make a difference
- It would worsen it

To what extent do you think AI-generated materials would save teachers time?

- They would save a lot of time
- They would save a few hours
- They would not save much time
- They would require even more time

What additional features would you expect from an AI-based lesson planning tool?

- Personalization of learning materials
- Real-time feedback
- Creation of interactive activities
- Other: _____

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