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TEACHING FOREIGN LANGUAGES IN THE KAZAKHSTANI CONTEMPORARY EDUCATIONAL PARADIGM

AL-FARABI KAZAKH NATIONAL UNIVERSITY

TEACHING FOREIGN LANGUAGES IN THE KAZAKHSTANI CONTEMPORARY EDUCATIONAL PARADIGM

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Collective monograph "Teaching Foreign Languages in the Kazakhstani Contemporary Educational Paradigm", dedicated to the 90th anniversary of Al-Farabi Kazakh National University, is the collective work of teaching staff of the Department of Foreign Languages, Philological Faculty, al-Farabi KazNU.

The monograph presents scientific investigations and works devoted to the issues of modern higher education system, the methodology of foreign language education, as well as philological issues in the system of modern higher education.

The monograph is intended for a wide range of specialists, scientists, young scientists, as well as undergraduates and doctoral students, and everyone interested in issues of higher education.

Коллективная монография «Teaching Foreign Languages in the Kazakhstani Contemporary Educational Paradigm», посвященная юбилею 90-летия КазНУ им. Аль-Фараби, представляет собой коллективный труд профессорско-преподавательского состава кафедры иностранных языков, филологического факультета КазНУ им. аль-Фараби.

В монографии представлены научные разработки и труды, посвященные вопросам современной системы высшего образования, методологии иноязычного образования, а также филологическим вопросам в системе современного высшего образования.

Монография предназначена для широкого круга специалистов, ученых, молодых ученых, а также магистрантов и докторантов, и всех интересующихся вопросами высшего образования.

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DEVELOPMENT OF TRANSVERSAL COMPETENCIES BY MEANS OF AIS (ARTIFICIAL INTELLIGENCE SOURCES) IN THE FRAMEWORK OF HEUTAGOGY

Diana Tektibayeva[3], Bayan Dzholdasbekova[4]

Abstract: The problem of the development of transversal competencies in terms of heutagogical framework and the implementation of artificial intelligence (AI) technologies into the educational process at graduate and postgraduate levels is discussed in this article. Heutagogy is the contemporary paradigm of the self-determined learning that applies a holistic approach to the development of learner's capabilities, meaning that in its core it has to be represented in various skills based on the ability to independently determine the self-dependent directions in life-long learning process. This requirement on its own may be effectively represented in the concept of the transversal competencies that are characterized as adaptability competencies. Heutagogy on the conceptual level has the range of peculiar differences from andragogy and these are presented in this article. As far as artificial intelligence nowadays becomes the important milestone in each and every aspect of human life, the educational sphere does not become an exception standing aside from this trend. Accordingly, in this article the existing general classifications of transversal competencies are analyzed and the brief descriptions of AI sources with the consideration of formed transversal competencies are introduced.

Keywords: transversal competencies, andragogy, heutagogy, education for sustainable development, artificial intelligence (AI) sources.

1. Introduction

The world in the 21st century is totally dependent on the development of technologies. Nowadays it's impossible to imagine humanity without the technologies that we use on everyday basis. The risks to the sustainable development in each and every country today determined by the technicality level of the main spheres of national economies that on its own depend on the integration of the latest and greatest technological achievements. Mostly we are connecting many practical aspects of day-to-day services like banking, shopping, and education with the online operations by means of the use of Internet. This situation leads to the consideration of the technical professions as the ones in the state priority but the stumbling block here is the future possibility of substitution of those professions by the new technologies. The most evident example is the development of Artificial Intelligence (AI) that may cause changes in each and every sphere of human life. Today AI already completes a vast majority of regular and specific operations taking jobs of labour power and this

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can lead to the disappearance of those professions. Scientific communities pay much attention to the investigation of the possible results of its development and its effect on humanity. Moreover, international organization such as UN and UNESCO conduct special conferences for the discussion of the problems of AI implementation into different spheres and the possible results of its introduction into the businesses.

2. Main part

Materials and methods.

In this paper we introduce the literature analysis of the specific objects under investigation, specifically we present the analysis of heutagogy as the new paradigm for the 21st century education, we also provide the analysis of transversal competences classifications and compiled own version of the classification, and finally, we described the analysis of the AI tools and platforms that can be applied for the development of different transversal competences and skills. We analyzed the documents of UN, UNESCO and WEF and generalized the findings. The main databases of sources were SCOPUS and RISC. The selection was done according to the key concepts of the discussed problem.

The actuality of the discussed problem is presented on different levels, for instance, on the World Economic Forum the "Future of Jobs Report" was introduced, and it provided scientific and business community with the list of skills that are demanded nowadays and will be on the rise in the nearest future (World Economic Forum, May 2023).

This document presents the "top skills of 2023" as follows: 1. Analytical thinking, 2. Creative thinking, 3. Resilience, flexibility, and agility, 4. Motivation and self-awareness; 5. Curiosity and lifelong learning; 6. Technological literacy; 7. Dependability and attention to detail; 8. Empathy and active listening; 9. Leadership and social influence; 10. Quality control.

Whereas the "top 10 skills on the rise" slightly differs and includes the following skills: 1. Creative thinking; 2. Analytical thinking; 3. Technological literacy; 4. Curiosity and lifelong learning; 5. Resilience, flexibility and agility; 6. Systems thinking; 7. AI and big data; 8. Motivation and self-awareness; 9. Talent management; 10. Service orientation and customer service.

These lists of top skills present the priority for the nearest time and the targeting aims for the formation and development in the future specialists on higher education level as far as they are the most demanded for the further successful career development.

Heutagogy – the new transformative educational paradigm of 21st century.

The modern fast developing world requires the quick adaptability and high level of efficacy of modern citizens. Every day the new technologies appear and specialists in each and every sphere have to acquire those novelties and implement them into their everyday work. This of course means that they need to study and adapt to those new trends in technologies. The model of "once and forever education" is outdated and this requires the well-known "life-long learning" model to be integrated into the experiences of human-beings.

One of the most effective in this terms learning strategic experiences is called Heutagogy and it is determined as – the study of self-determined learning and applies a holistic approach to developing learner capabilities with the learner serving as, "the major agent in their own learning, which occurs, as a result of personal experience" (Hase & Kenyon, 2007, p. 112; Blaschke & Hase, 2019, p. 1). Blaschke L.M. proclaims heutagogy as the derivative extension to andragogy and determines it as the one that was built on the theories constructivism, humanism, capability, connectivism, systems thinking, complexity and the neuroscience of learning. The core idea of this scientific direction is – the learner agency and the ability of the learner to choose his/her pathway to learning. (Blaschke & Hase, 2019, p. 1)

According to Kim J. (Kim, 2022), heutagogy, or self-determined learning, can provide a model of online learning and teaching in higher education that develops autonomous capabilities for learners to design and create their own learning paths based on their needs, while promoting a new era of life-long learning that is critical for a changing digital world.

Many scientists refer to heutagogy as to the appropriate learning framework for 21st century learners and educators as it places the learner to the leading active role who can determine his/her learning trajectory and correct it when needed. When we say about the ability of a person to determine own way, we can also refer to the concept of "self-actualization" presented by A.Maslow (1943), as it considered as the highest result of personal development in any sphere of his/her life. That also means that it includes the fundamental idea of humanism and based on the humanistic principles. Blaschke L.M. denotes the main principles of heutagogy as: *learner agency* – as the power to learn that is self-determined by the learner; *reflection* – that is characterized by single-loop and double-loop learning, where the learner reflects not only on what is learned (single-loop learning) but also on how it is learned and how this knowledge influences one's value system (double-loop learning); *capability* – as the principle that involves using competencies in new contexts and challenging situations. (Blaschke & Hase, 2019, p. 1)

The realization of the heutagogy in practice is tightly connected with the theory of social constructivism – learners gain knowledge as they move from the known to the unknown (Olson & Hergenhahn, 2009).

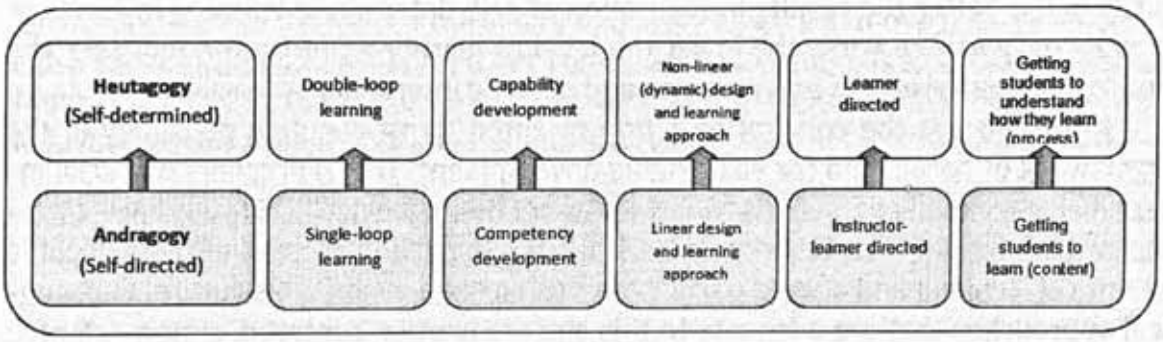
Serious researches were held in the field of studying social constructivism, which have been developed on the basis of a cognitive approach. Its essence is that the learning process is seen as a process of active constructive development of students, when they play a role in the process of learning and become active participants in the learning process, they themselves build (construct) hypotheses, experiment, draw conclusions and come to a certain opinion, based on personal experiences, interests and value system (Williams & Burden, 1997).

Social constructivism emphasizes the importance of culture and context in understanding what is happening in society and building knowledge based on this understanding (Derry, 1999, McMahon, 1997). This point of view is closely connected with many other theories, primarily with the development of the theory of L.Vygotsky and J.Bruner and the social cognitive theory of A.Bandura (Shunk, 2000).

Thus, D. Phillips interprets social constructionism or social constructivism as the theory that the branches of knowledge or disciplines that have been built are the constructs created by man, and that their forms were determined by such things as politics, ideology, values, manifestations of power, religion, and economic interests. This approach focuses on how power, economics, political and social factors influence the ways in which groups of people form understandings and formal knowledge of the world around them. These branches of knowledge are not considered an objective representation of the outside world (Phillips, 2000).

When applied in practice, a constructivist approach is learner-centered and characterized by elements like: active and authentic learning, learning-by-doing, scaffolded learning, and collaboration (Harasim, 2011, pp. 68-73)

Heutagogy can be viewed as an extension or continuum of andragogy, or self-directed learning. In expanding on this idea, Blaschke (2012) described the shift from andragogy to heutagogy according to the central principles of heutagogy as follows:



Picture 1: According to Blaschke Heutagogy is considered as an extension of andragogy (Blaschke, 2012).

The significant difference between andragogy and heutagogy is the final result of personal development, the andragogy mostly supposed to develop competencies whereas heutagogy is aimed at the development of capabilities. Competency usually defined as the ability and readiness to accomplish the variety of different actions, and capability here can be described as the conscious determination of a person to self-realization and the developed sensibility to novelties. The capabilities though have to be developed above competencies and mostly be developed consciously and purposefully, they can be described as the combinations of competencies actively and intentionally applied and polished in practice.

Luckin R. suggests the so-called PAH continuum standing for the concept "pedagogy-andragogy-heutagogy" and provided comparison between these concepts.

As far as the main activity in the context of heutagogy is determined as the research we can identify the high rate of cognitive involvement of a student that leads to the experiential type of development and education that on its concern leads to the continuous development of a wide range of competencies.

Table 1

PAH Continuum (Luckin et al., 2010, p. 78)

INDICATOR	Pedagogy	Andragogy	Heutagogy
Locus of Control	Teacher	Teacher/Learner	Learner
Education Sector	School	Adult	Research
Cognition Level	Cognition	Meta-Cognition	Epistemic Cognition
Knowledge Production Context	Subject Understanding	Process Negotiation	Context Shaping

We also have to admit the idea that was presented by Canning (2010) who noticed the direct correlation between the education environment that may effect the results of the progress in the heutagogical context. Two main factors that are usually contributing much on the progress are: 1. learner maturity and autonomy required and 2. instructor control and course structure. The higher the level of learner maturity is the better the results in realization of self-determined learning in terms of heutagogy, and vice versa the lower the level of learner maturity the more he/she needs the supervision of an instructor and didactic interaction.

In this regard the concept of action-oriented transformative pedagogy in the framework of "education for sustainable development" (ESD) presents a special interest as it generally co-sounds with the ideas of heutagogy: "ESD is about empowering and motivating learners to become active sustainability citizens who are capable of critical thinking and able to participate in shaping a sustainable future. Pedagogical approaches that are adequate to this aim are learner-centered, action-oriented and transformative" (UNESCO. ESDG, 2017).

Transversal competencies in the heutagogical context

Becoming active sustainability citizen means becoming self-efficient person who predetermines the effect and the results of his/her actions and capable of maintaining the types of activities that will increase the output and keep it as stable and effective as possible. The educational aspect in this term also transforms into self-activated and self-controlled type of education. The self-directed and self-determined education requires the qualities that will maintain the consistency of the education and workflow. These types of qualities usually described in terms of "skills", "competences" and "competencies". The general descriptions and definitions for those are the abilities to do or accomplish some sort of activities and actions, but they generally differ in scale.

E.F. Zeer defines competencies as generalized methods of action, ensuring productive performance of professional activities (Zeer, 2005), and this denotes the importance of implementation of professionally meaningful types of activities.

Identification of the specific types of competencies and skills needed to become self-efficient in the heutagogic context means determination of the vital types of competencies that will lead any person to the full realization of his/her potential. In the document "Education for Sustainable Development Goals: learning objectives" presented by UNESCO the key competencies are described to be transversal, multi-

functional and context-independent as well as – "competencies describe the specific attributes individuals need for action and self-organization in various complex contexts and situations,... should include cognitive, affective, volitional and motivational elements; ... cannot be taught, but have to be developed by the learners themselves, ... acquired during action, on the basis of experience and reflection" (UNESCO. ESDG, 2017). In this document the key competences for sustainability are denoted as: *Systems thinking competency*; *Anticipatory competency*; *Normative competency*; *Strategic competency*; *Collaboration competency*; *Critical thinking competency*; *Self-awareness competency*; and *Integrated problem-solving competency*.

The combination of competencies in heutagogical context may vary depending on the social demand and may generally integrate the universal types of pragmatic competencies – those that are always needed and of universal value. However, scientists determine various lists, classifications and combinations of transversal competencies and these versatile combinations can be modified depending on the final purposes of person development. Mukhidova O. denotes that *transversal competencies* are characterized by the ability to quickly adapt and move from one field of activity to another, and also play a key role in achieving success in the labor market (Mukhidova, 2023). In that sense we may say that transversal competencies may be described as the adaptability competencies as well.

Table 2

Classification of transversal competencies by Shults O.N., and Ilina N.N. (Ilyina, 2020)

Instrumental competencies – those that have an instrumental function and include:	*Interpersonal competencies* – that tend to facilitate collaboration, social interaction and include:	*Systemic* or *integrative competencies* that are:
– cognitive skills – the ones that identifies in the abilities to understand and use thoughts and ideas. – methodological skills necessary for interaction in a professional environment. – technological skills that involve the use of technical tools, computers and information management skills. – linguistic skills, both oral and written communication, or knowledge of a second language.	– individual skills – those related to the ability to express feelings or perceptions of a problem, the ability to criticize and constructively accept criticism. – social and interpersonal skills related to the ability to work in a team and express ethical or social responsibilities in a socially acceptable manner.	– skills and competencies associated with the educational process as a whole; – that allow us to include and assess the skills needed to plan and improve the educational process.

Scientists Shults O.N., and Ilina N.N. (Ilyina, 2020) denote that *transversal competencies* are also known as core competencies, core skills, general skills, transferable skills, soft skills, employability skills, 21st century skills; these competencies are key elements of innovation and competitiveness, and also, they contribute to

the motivation and self-realization of employees, thereby increasing the quality and productivity of work. Authors designed the classification (Table 2) of transversal competencies which included three subgroups of competencies as follows: instrumental, interpersonal and systemic.

Another group of scientists García-Álvarez J., Vázquez-Rodríguez A., Quiroga-Carrillo A., and Priegue Caamaño D. (García-Álvarez et al., 2022) conducted the research work on the analysis of various classifications of transversal competencies and prepared the integrative classification with 5 groups of skills and specific competencies (Table 3).

Table 3

Classification of the transversal competencies (García-Álvarez et al., 2022)

	Competency		Competency
1. Job-related basic skills (JRB)	JRB1. Basic skills: literacy, numeracy, oral and written communication JRB2. Basic and job-specific ICT and computer skills JRB3. Basic knowledge and skills of the field and the profession	4. Entrepreneurship skills (ENT)	ENT1. Leadership skills ENT2. Creativity and innovation skills ENT3. Project design and management skills ENT4. Initiative and entrepreneurial spirit ENT5. Taking risks
2. Self-management skills (SM)	SM1. Problem-solving skills SM2. Flexibility and adaptability skills SM3. Analytical skills SM4. Life-long learning skills SM5. Critical thinking skills SM6. Information management skills SM7. Organizational skills SM8. Time management skills SM9. Decision-making skills SM10. Positive attitude and motivation SM11. Ability to apply theory into practice SM12. Ability to work independently SM13. Emotional intelligence SM14. Career management skills SM15. Multidisciplinary knowledge SM16. Multitasking	5. Social and professional responsibility skills (SPR)	SPR1. Ethical working SPR2. Responsibility SPR3. Professionalism SPR4. Concern about quality and improvement of the work SPR5. Social awareness and responsibility SPR6. Environmental sustainability awareness SPR7. Commitment to health and safety SPR8. Gender awareness
3. Socio-relational skills (SR)	SR1. Teamwork skills SR2. Interpersonal skills SR3. Foreign language skills SR4. Oral presentation skills SR5. Negotiation skills SR6. Knowledge-sharing skills SR7. Ability to work with diversity and multiculturality SR8. Networking skills SR9. Ability to work in an international context		

The thorough analysis that was presented by García-Álvarez et al. (2022) demonstrates an expanded model of the classification that includes a variety of different groups of competencies but at the same time it can generally be combined further more – as far as Job-related basic skills (JRB) and Entrepreneurship skills (ENT) can be joint and form – the group of professional competencies; as well as Socio-relational skills (SR) and Social and professional responsibility skills (SPR) can also be integrated and form – the group of social competencies. So, we may then get the alternative classification with – 1. Group of professional competencies; 2. Group of self-development and self-management competencies; and 3. Group of social competencies.

According to the international research "keystart2work" within the framework of Erusmus + EU project there was presented another alternative catalogue of transversal competences that came as a result of the analysis of data obtained out of a large-scale survey, interviews, focus group discussions, and other sources. The document "Catalogue of transversal competences. Key for Employment" (KEYSTART-2WORK, 2016) includes twelve domains:

- Intercultural skills & global awareness;
- Flexibility & adaptability;
- Strategical & innovative thinking;
- Organization & time management;
- Decision making;
- Teamwork;
- Empathy / ability to build relationship;
- Problem solving;
- Learning orientation;
- Negotiation skills;
- Leadership;
- Collecting and processing information.

Also, the document includes additional descriptions of the Definition, Knowledge, Skills (behaviours), and Attitudes – to each of the competences included in the catalogue that provide better understanding of the selections.

Taking into account the wide range and variety of existing classifications we came to the conclusion that there is no universal type of classification with clear componential structure and decided to suggest our own variant of this classification. Generalizing the whole scope of provided classifications we can consider that the main system can be presented as three main competencies – *personal self-managerial competency*, *interpersonal and intercultural social competency*, and *transformative self-creative professional competency* – including the range of specific skills and qualities. The components of each mentioned competencies may vary depending on the social demand and on the period and place of personal and professional development of a specialist.

In the following table (Table 4) we suggest our own classification of the competencies with skills and qualities.

Table 4

The classification of the transversal competencies with skills and qualities

Competency	The range of skills and qualities
Personal self-managerial competency	– Emotional intelligence (Intrapersonal EQ, Interpersonal EQ, Stress Management EQ, Adaptability EQ, General Mood EQ by Bar-On EQ-i); – Organizational (decision-making and time-management) skills; – Flexibility and adaptability skills; – Leadership skills; – Life-long learning skills; – Initiative and entrepreneurial skills.
Interpersonal and intercultural social competency	– Empathy, tolerance and ability to build relationships; – Intercultural skills and global awareness; – Social awareness and responsibility.
Transformative self-creative professional competency	– Analytical and critical thinking skills; – Creativity, productivity and innovation skills; – Problem solving and risks-taking skills; – Economic and environmental sustainability awareness; – Career management (knowledge and skills of the field and the profession) skills; – Technological literacy & digital skills (ICT, AI, AR, VR and computer); – Researching skills.

The main reason for the transformation of the well-known classifications into our hierarchical system – "competency integrating skills and qualities" – is the clarification of the leveled structure for the practical formation of transversal competencies in the framework of educational process that will include the gradual formation of these competencies.

3. Discussions and Conclusion

Taking into account the suggested system of competencies with included skills and qualities we analyzed the existing AI sources and their applicability in the process of the formation and development of transversal competencies.

The development of transversal competencies by means of ICT

When modeling a competency-oriented educational environment, it is necessary to determine the transversal qualities of a future specialist at the level of content-target settings (Ulyashina, 2010). And of course, the implementation of newest technologies into the educational process will be predetermined by the educational priorities and perspectives.

As the modern society is developing towards digitalization of educational and work processes many people start to use AI sources.

Many scholars and businessmen claim that AI may lead to the total transformation of a vast majority of "intellectual professions" and it also may bring the revision of the functions of many of them, moreover AI may lead to the formation of the demand to the new types of professions and it again will lead to the serious transformations in many spheres. In this regard the need for the development of transversal competencies uprises as these competencies will become the base for the adaptability in many professional areas.

For the development of some of the above listed skills and qualities we identified the table of free AI platforms (Table 5) that can serve as the tools for the formation and development of those skills. Out of the brief analysis we denoted that they can be used in different combinations and can be integrated into the system; or can be introduced as the multileveled groups of sources.

Table 5

AI platforms that can serve as the tools for the formation and development of skills and competencies with the short descriptions of AI tools functionality (TopAI.tools site, 2023). https://topai.tools/

№	The name of the source	The short description of functions / Link	The list of potentially developed competencies
1	2	3	4
	Resoomer RESOOMER	Resoomer is the platform that extracts core insights from dense content, it includes intelligent synthesis, automated summarization, citation identification, browser integration, customizable summaries, and multilingual support. Link: https://resoomer.com/en/	Can be applied to develop *analytical and critical thinking skills;*
	BrainBuzz BrainBuzz	BrainBuzz is an AI tool that generates custom quizzes and tests based on uploaded documents and uses advanced automated analysis to extract key information and identify important concepts from scientific papers, books, scripts, and other relevant materials. Link: https://www.brainbuzz.io/?via=topaitools	
	StudyCards App	The Studycards app is an AI-powered flashcard maker that helps users memorize information by swiping through cards and listening to them. Link: https://studycardsapp.com/?via=topaitools	
	Ryze	An AI-powered chrome extension that can summarize long articles or textbooks, generate quizzes, and unravel complex topics. Link: https://chrome.google.com/webstore/detail/ryze/ckpcembfkpkcnlnneiabcppkjhcfdidc?via=topaitools	
	FeedbackAI	FeedbackAI is a personal AI writing assistant for instant feedback – it takes writing (essay, article, etc) and offers advanced writing suggestions, rewrite suggestions, and others. Link: https://chrome.google.com/webstore/detail/feedback-ai-ai-powered-wri/nhhfgddgmenebgehoigpajmjhhknalfh	
	Teach Anything Teach Anything	Teach anything is a platform using AI that helps to describe a concept to be taught or learnt, and gives suggestions in language depending on difficulty level. Link: https://www.teach-anything.com/?via=topaitools	

1	2	3	4
	Essaybot	Essaybot is a free AI-powered essay writing tool that suggests the best content and helps writers find inspiration sources, paraphrase sentences, and generate complete sentences. It includes a citation finder to match sources and prevent plagiarism concerns and can assist with a variety of topics. Link: https://www.essaybot.com/?via=topaitools	
	History Timelines	"History Timelines" allows users to create timelines of historical events or view pre-verified timelines. Link: https://historytimelines.co/?via=topaitools	
	LearnSmarter.ai	The World's #1 AI Learning Assistant for Self-Growth. Learnsmarter.ai is an AI learning tool that offers personalized learning experiences through various AI tools, including book recommendations, key takeaways, summaries, and action plans. The tool is powered by OpenAI, and its use is for educational and personal purposes only; users however should verify information before relying on it. Link: https://learnsmarter.ai/?via=topaitools	
	Conker	Conker is an AI-powered quiz creation tool designed to make creating assessments easy with a range of question types, it allows to tailor quizzes to match the needs of students and differentiate between different groups of learners in the class. Link: https://conker.ai/?via=topaitools	Can be useful to develop *creativity, productivity and innovation skills;*
	Teacher-tools.ai	AI Tools for the school education – that can provide the Detect GPT, Convert Text-to-Voice and Inspire the class with AI Art generation. Link: https://teacher-tools.ai/	
	Doodlocracy	Doodlocracy is an AI tool for drawing games where players can join existing games or create new ones; it involves drawing unique assignments using different colors and brushes, with the AI generating its own version of the player's art for others to guess. Link: https://doodlocracy.com/?via=topaitools	
	Bloom	Powered by GPT-4 by default, Bloom is always-on, always-engaged learning companion that students can chat with about any topic, whenever they want. Bloom is a theory-of-mind-optimized Socratic interlocutor seamlessly integrated into Discord, pedagogically trained to help student to learn anything and designed to help build students' critical skills. Link: https://bloombot.ai/?via=topaitools	Can be productive to develop *technological literacy & digital skills*

1	2	3	4
	Paperclips Copilot	Paperclips Copilot is an AI-generated flashcard tool that helps create quality flashcards from course notes, language notes, and digital notes, it also automatically generate flashcards in different languages and export them in popular formats like Anki, Quizlet, PDF, and CSV. Link: https://www.paperclips.app/copilot?via=topaitools	*(ICT, AI, AR, VR and computer)*
	GPTionary	GPTionary is an Automate Thesaurus platform with AI, that provides definitions and examples for words and phrases, synonyms and related terms, it can also generate custom word lists based on input and can provide personalized quizzes. Link: https://gptionary.com/?via=topaitools	May be introduced to develop *Life-long learning skills*; *Analytical and critical thinking skills*
	Tech-treks.com	AI powered tech resource for anyone seeking to deepen their understanding of various technologies, offering AI powered learning paths that include crash courses, engaging code challenges, code snippets, interview preparation Q&A roadmaps, and more. Link: https://www.tech-treks.com/	Can be applicable for the development of *life-long learning skills*
	TutorAI	TutorAI is an online educational platform that allows users to learn physics, American history, and other topics, it provides a variety of educational materials such as notes, tutorials, and interactive quizzes. Link: https://www.tutorai.me/?via=topaitools	
	Langotalk	Langotalk is an AI chat-based tool that helps users learn languages faster, provides opportunity to overcome social anxiety, emphasizing immersion, learning, memorization, and practice to improve language skills. It supports 8 different languages and collects achievements and awards. Link: https://www.langotalk.org/?via=topaitools	
	IELTS Podcast	IELTS Podcast is an AI tool that helps users prepare for academic writing tasks such as describing tables, maps, diagrams, and graphs, includes a timer and provides band score assessments. It emphasizes the use of exclusive US or UK English to avoid negatively affecting exam scores. Link: https://essaycheck.ieltspodcast.co/draft?via=topaitools	

1	2	3	4
	Prepsup	Prepsup is an AI-powered quiz and flashcard generator that helps students to prepare for exams as it allows users to create study sets based on their learning needs by adding topics, selecting education level, and language. The tool also generates custom flashcards and has an AI quiz assistant. Link: https://www.prepsup.com/?via=topaitools	
	Interactive Mathematics	The AI math is an interactive mathematics tool that combines a powerful mathematical computational engine with an artificial intelligence language model to provide accurate solutions. It can handle a wide range of math problems, from tough word problems to algebra equations and advanced calculus. Link: https://www.intmath.com/	Can bring results in the development of *problem solving and risks-taking skills*
	Research Rabbit	Researcher rabbit is a platform built for researchers that provide a lot of tools to help discover, visualize and gain insights from research papers, it also helps researchers to collaborate and comment on research papers. Link: https://www.researchrabbit.ai/?via=topaitools	Can be applied to develop *researching skills*
	Consensus	Consensus is an AI-powered search engine that provides evidence-based answers faster, for instance, helps users find direct scientific research and peer-reviewed studies on a variety of topics. The tool extracts key findings from scientific papers and offers instant analysis. Link: https://consensus.app/?via=topaitools	

Out of our brief analysis of the sources specifically based on the AI application we have generated the collections of platforms and tools that can be used for the development of different transversal skills and competences; we also came to the conclusion that we can see a trend or the ranking ratio for the number of tools per competency formed as follows: 1. *Analytical and critical thinking skills*; 2. *Creativity, productivity and innovation skills*; 3. *Technological literacy & digital skills (ICT, AI, AR, VR and computer)*; 4. *Life-long learning skills*; 5. *Problem solving and risks-taking skills*; 6. *Researching skills*. We determined that the majority of tools and platforms can be applied for the development of *analytical and critical thinking skills*, whereas the *researching skills* and *problem solving, and risks-taking skills* are out of trend and there exists the lack of sources for their development.

We also have to admit that other skills, like – Emotional intelligence (Intrapersonal EQ, Interpersonal EQ, Stress Management EQ, Adaptability EQ, General Mood EQ by Bar-On EQ-i); Organizational (decision-making and time-management) skills; Flexibility and adaptability skills; Leadership skills; Initiative and entrepreneurial skills; Empathy, tolerance and ability to build relationships; Intercultural skills and global awareness; Social awareness and responsibility; Economic

and environmental sustainability awareness; and Career management (knowledge and skills of the field and the profession) skills – are not implemented into the range at all as the analyzed sources are not considered to develop these skills. Taking into consideration this fact we think that there should be the extended type of classification of sources with the extra additional ICT sources for their development and they might supplement and cover the gap in the lacking AI sources. This classification of course can be flexible as it can be modified with the newest tools and platforms that will appear soon in the nearest future; and it should be provided based on the detailed practical experiences investigations that will take place in our further researches.

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