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BIBLIOMETRIC EXPLORATION OF TWENTY-FIRST CENTURY SKILLS IN HIGHER EDUCATION USING VOSVIEWER

Abstract. This study explores how 21st century skills have been promoted within higher education between 2015 and 2023, drawing on a systematic literature review and bibliometric analysis. A total of 423 journal articles indexed in Scopus were examined using VOSviewer and SciVal. The review points to the potential of heutagogical approaches, when considered alongside the P21 Framework, to support self-determined learning and to encourage students to take greater ownership of their progress in online settings. These approaches have the potential to position learners as active participants in shaping their own educational pathways. The bibliometric analysis traced publication patterns across disciplines, identified thematic clusters and frequently co-occurring keywords, and mapped patterns of international collaboration. The findings underscore the importance of integrating critical thinking, communication, collaboration, and creativity into online higher education, with practical implications for faculty and curriculum designers, particularly within the context of Kazakhstani universities. Heutagogical strategies informed by the P21 Framework are offered as one way to prepare students for lifelong learning in educational environments that continue to shift and evolve.

Keywords: 21st century skills, heutagogy, P21 Framework, higher education, Kazakhstan

Introduction

Higher education in Kazakhstan has undergone major changes with the adoption of online lifelong learning pathways. These developments include mobile learning, MOOCs, and the emphasis on soft skills (MSHE, 2023). Yet, limited attention has been given to cultivating 21st century skills such as critical thinking, communication, collaboration, and creativity (4Cs) in terms of modern instructional approaches and meaningful technology integration. For instance, online learning platforms foster communication and critical thinking skills among learners in higher education of Kazakhstan (Amangozhayeva & Amangozhayeva, 2025). Kazakhstan pursues interdisciplinary education that emphasizes legal, cultural, and ethical skills (Jalilov et al., 2025), while developing learners' collaboration and communication skills in STEAM education (Mynbayeva, 2025) and fostering a knowledge-based economy through literacy and digital problem-solving skills (Toimbek, 2023). Advancing these skills requires innovative teaching methods and the effective use of technology in higher education.

The framework of the Partnership for 21st Century Skills (P21 Framework) emphasizes that 4Cs are essential components for the education and career advancement of students to navigate the difficulties of the 21st century (Aifan, 2021). Heutagogy, as a paradigm for self-determined learning, underscores the cultivation of 21st century competencies through the use of innovative pedagogical tools (Blaschke, 2012; Yang & Sze, 2021). More specifically, technological skills such as information literacy, media literacy, and technology literacy as well as self-directed skills, responsibility, cultural skills, and social skills are most preferred in various working contexts (Voogt & Roblin, 2012). The COVID-19 pandemic fostered the development of emerging technologies, also known as Education 4.0, and made employers reappraise the importance of competencies and skills within the agenda of sustainability and transformative innovations (Aver et al., 2021; Simeunovic et al., 2022). Consequently, the pandemic revealed that university teaching staff around the world were not ready to effectively implement online teaching and learning strategies to enhance students' skills (Wang & Torrisi-Steele, 2023a). This led to the understanding that learning might happen emergently with no

time for formal preparation of university faculty (Blaschke & Hase, 2016). Therefore, HEIs must first consider the possibilities for faculty development in terms of emphasizing the importance of instructors' agency in incorporating transformational teaching and learning approaches for the development of students' 21st century capabilities (Bali & Caines, 2018).

This research study explores emerging patterns in the development of 21st century capabilities within higher education (2015-2023) through an in-depth review of the literature and bibliometric mapping. Accordingly, the study focuses on the following research question: How can heutagogical approaches and the P21 Framework in higher education promote 21st century skills, and what emerging scholarly trends reveal about their development?

Bibliometrics, as a term, refers to the analysis of quantitative data extracted from various sources of literature (Budd, 1988). The Scopus database was utilized to extract pertinent peer-reviewed literature to answer the research question of this study (Guiling et al., 2022). Furthermore, bibliometric mapping analysis was conducted using VOSviewer bibliometric software to design various network connections to explore emerging occurrences of 21st century skills development (Van Eck & Waltman, 2010). This study attempts to contribute to the recognition of 21st century skills development in higher education and proposes that the HEIs of Kazakhstan implement pedagogical teaching and learning design elements to equip students with the most current 21st century skills.

The remainder of the paper is organized as follows. The next sections present the theoretical framework, systematic literature review and bibliometric mapping, methods, results, and discussion. Finally, the conclusion is drawn in the final section based on the main results of the study, followed by the references.

Theoretical Framework

Heutagogy, rooted in constructivism, provides a framework for developing self-determined learning and innovation skills such as critical thinking, communication, collaboration, and creativity as essential 21st century capabilities in higher education. It seeks to cultivate capable lifelong learners through the use of Education 3.0 and 4.0 technological affordances, such as digital platforms, virtual reality, mobile learning, and automated learning (Blaschke & Hase, 2016). At its core, heutagogy emphasizes a responsible learning paradigm wherein educators serve as content providers while learners collaboratively develop their own knowledge (Hase & Kenyon, 2000).

The P21 Framework highlights the importance of the 4Cs skills and has been applied across higher education at various levels (Borrowski, 2019). Building on this, heutagogical theory supports not only the development of these skills but also promotes learner ownership through self-determined principles, including knowledge sharing, connection, exploration, reflection, collaboration, and creation (Blaschke & Hase, 2016).

Literature Review

The concepts of critical thinking, communication, collaboration, and creativity have been explored through heutagogy and the P21 Framework as pathways to strengthening 21st century capabilities, promoting self-directed online learners, and encouraging active responsibility in digital learning environments.

Building 21st Century Capabilities in Higher Education

The literature increasingly indicates the importance of 21st century skills, particularly the 4Cs in higher education. Studies show that employability and digital skills complement the 4Cs in equipping students for professional careers (Habets et al., 2020; Salem et al., 2022). Empirical evidence suggests that critical thinking and creativity significantly enhance postgraduate problem-solving and performance, while collaborative peer interaction promotes both creativity and motivation within smart classroom environments (Almulla, 2023). Similarly, critical thinking and collaboration links between creativity, digital literacy, algorithmic thinking, and communication among undergraduates (Kocak et al., 2021). Interactive online learning played a key role in strengthening STEM graduate learners' communication skills during the pandemic period (Yoel et al., 2023), while interpersonal skills supported their adaptation and collaboration (Wing On, 2014). In this regard, heutagogical learning in online environments may strengthen employability skills (Blaschke & Hase, 2016).

Research further connects technological advances with collaborative skill development. For instance, gamification projects at a Malaysian university promoted teamwork and problem-solving (Lee et al., 2023), while informal collaboration through social media tools supported lifelong learning consistent with heutagogical principles (Glaister et al., 2024; Hase & Kenyon, 2013). Instructors play a central role as “learning leaders”, fostering learner-centered approaches and transformative engagement (Hase 2014). However, studies note gaps in faculty technological skills, such as LMS use, which can limit learner independence (Devi & Aparna, 2020). Platforms like Moodle and Blackboard have been shown to enhance peer assessment, self-efficacy, and collaborative learning (Loureiro & Gomes, 2023), while LMS affordances support reflection, critical thinking, and digital skills (Spector et al., 2016).

Furthermore, these findings reflect Hase’s (2014) view of learning leaders fostering lifelong learning through innovative teaching. The Assessment and Teaching of 21st Century Skills (ATC21s) project advanced technology-based assessment to strengthen creativity, problem-solving, communication, collaboration, and broader competencies (Bourn, 2018). Heutagogy promotes autonomy and capability through learner-centered, reflective, and non-linear approaches, enhancing self-determined learning among graduate students (Chun & Abdullah, 2023; Wang & Torrisi-Steele, 2023a). Similarly, the P21 Framework highlights project-based collaboration, ICT skills, problem solving, communication, and critical thinking as key 21st century competencies (Aifan, 2021).

Development of Self-determined Learners

The development of learner capabilities in active learning environments is a core aspect of heutagogical design (Blaschke, 2012). Integrating the 4Cs framework into Business English instruction has been shown to foster positive attitudes towards 21st century learning, strengthening creativity, critical thinking, collaboration, and communication capabilities (Aben Ahmed, 2022). Collaborative reflection through online discussion forums has been found to support self-determined learning and professional growth (Canning & Callan, 2010). Evidence also indicates that critical thinking is closely connected to reflective thinking and creativity among undergraduate biology students (Suciati et al., 2022). Game-based learning environments have been shown to strengthen professional development, engagement, and reflexivity through the cultivation of the 4Cs (Bakhsh et al., 2022; Robberts & Van Ryneveld, 2022).

Moreover, digital technologies support skills such as digital literacy, technology literacy, data literacy, soft skills, adaptability, and learning agility (Bennett & McWhorter, 2021, cited in Wang & Torrisi Steele, 2023b). Technological innovation is essential for cultivating self-determined learning in learner-centered online contexts (Blaschke & Hase, 2016). In Malaysian higher education, heutagogical practices, including learner-defined contracts, flexible curricula, negotiated assessment, reflective practice, and collaboration, were found to strengthen human capital through innovative technologies (Tajudin et al., 2020). Flipped learning before and during COVID-19 effectively developed citizenship, critical thinking, and creativity among learners (Latorre Cosculluela et al., 2021). Project-based and blended learning further promoted autonomy, lifelong learning, motivation, and knowledge sharing (Alamri, 2021). Overall, heutagogical environments that value sharing, connection, creation, and reflexivity promote lifelong learning among learners (Blaschke, 2012; Wang & Torrisi Steele, 2023a).

Agency and Responsibility in Online Learning Spaces

Heutagogical learning recognizes learners as responsible agents who make choices about both what they learn and how they approach that learning (Blaschke & Hase, 2016). In this context, responsibility denotes self-directed adult learners (Wang & Torrisi-Steele, 2023b) who actively co-construct knowledge and embrace online lifelong learning (Blaschke, 2012). Instructors, meanwhile, serve as facilitators by providing resources (Wang & Torrisi-Steele, 2023a), while higher education institutions adapt strategies to promote responsible learning within sustainability agendas (Aver et al., 2021). Flipped classrooms enhance graduate students’ lifelong learning, performance, and agency, while also influencing how instructors engage with 21st century skills development (O’Flaherty & Phillips, 2015). Overall, student-centered approaches encourage learners to take

responsibility for their education, fostering self-determined lifelong learning in the development of the 4Cs (Badke, 2012; Blaschke, 2012; Hase & Kenyon, 2000).

In this regard, instructional strategies highlight new aspects of student-centered learning. Heutagogical design in online modes supports the advancement of 21st century capabilities. Moreover, incorporating the 4Cs into Kazakhstani higher education offers opportunities to strengthen skill development. The implementation of transformational approaches in teaching and learning can prepare learners for career advancement and human capital development in the 21st century. By integrating heutagogical principles and applying modern technologies, higher education can promote self-determined learning.

Methods

A bibliometric mapping was conducted by defining a research question, selecting the Scopus database, and applying inclusion and exclusion criteria to extract relevant publications. The results were analyzed within the framework of heutagogical theory and related literature. Publication trends by subject area were examined using Elsevier SciVal, a benchmarking tool for Scopus-indexed outputs (Dresbeck, 2015). This study mapped the main themes and keyword links in research on 21st century skills in higher education, while also highlighting the countries where this work is most concentrated (Van Eck & Waltman, 2010). To get a clearer picture of these patterns, VOSviewer (version 1.6.19) was utilized to create visual maps of the data (Van Eck & Waltman, 2010).

Retrieving Relevant Data

A refined search of Scopus was conducted for the period 2015–2023 using keywords including “21st century skills” and “higher education,” aligned with heutagogical theory and the P21 Framework. Only empirical articles in the English language were considered. The initial search returned 805 records. After applying filters for document type and language, 431 publications remained. These records were then reviewed in Microsoft Excel to identify and remove duplicates, which resulted in five exclusions. The final dataset consisted of 427 publications, which were imported into SciVal and VOSviewer for bibliometric mapping in line with the aims of the study.

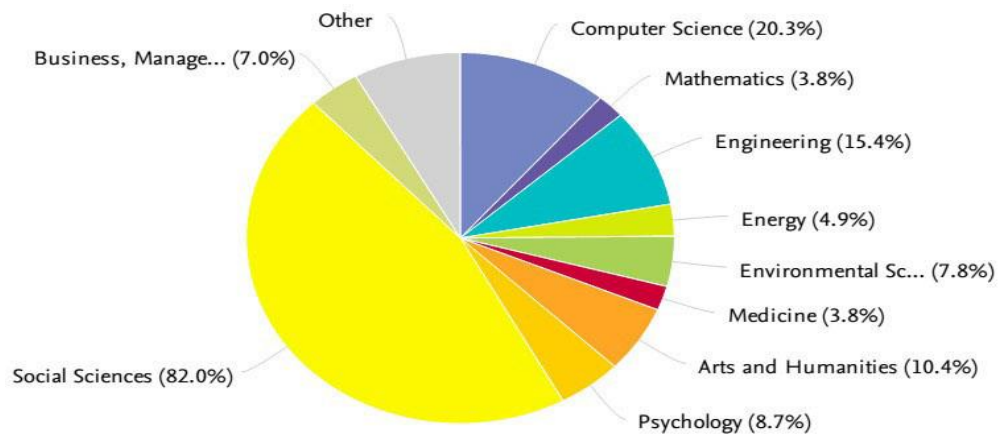
Results

A closer examination of the publication data revealed discernible patterns in how 21st century skills have been taken up across academic disciplines. Based on the All-Science Journal Classification (ASJC), the period between 2017 and 2022 emerged as the most productive in terms of research output in this area. As illustrated in Figure 1, higher education institutions appear to be integrating these skills across a broad range of disciplinary contexts. The largest share of publications originated from the Social Sciences, with notable contributions also appearing in Computer Science and Engineering. Smaller but meaningful clusters of work were observed in fields such as Business, Medicine, and Psychology.

The content of the publications indicates a sustained emphasis on competencies such as problem-solving, critical thinking, and digital literacy. These focal areas resonate strongly with the principles of heutagogy and the P21 Framework, both of which advocate for self-determined learning and the cultivation of transferable skills essential for contemporary life (Hase, 2014). At the same time, the pattern of publication activity reflects a broader institutional commitment among universities to preparing graduates for professional practice and to advancing human capital development more generally (Tajudin et al., 2020).

Figure 1

Publication distribution across subject areas

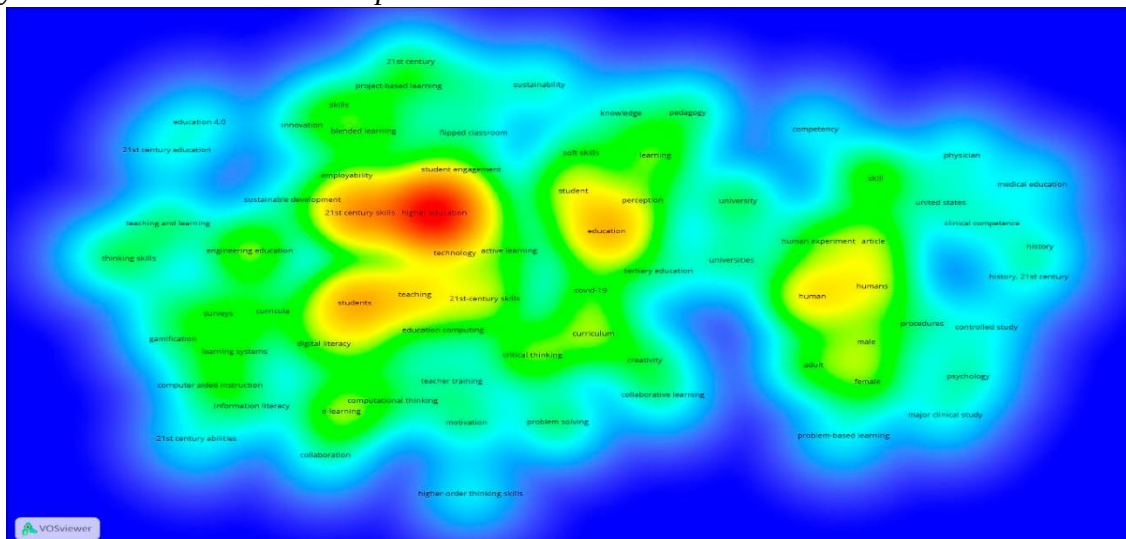


Note. Source: SciVal overview report on publications related to 21st century skills.

Following the overview provided by SciVal, a keyword co-occurrence analysis was conducted using VOSviewer to examine the relationships among terms appearing in 423 Scopus-indexed articles concerned with 21st century skills in higher education. This methodological approach supports the identification of emerging themes and research hotspots within a given field (Kevork & Vrechopoulos, 2009; Zhao, 2022). Using the density visualization function in VOSviewer, a heatmap was generated, as shown in Figure 2, in which color variations denote the frequency of term occurrence. Areas appearing in red indicate higher density, whereas blue areas reflect lower occurrence.

A clustering algorithm was subsequently applied to reveal thematic groupings among keywords (Van Eck & Waltman, 2010). A minimum occurrence threshold of five was established, which reduced the initial set of 1,992 keywords to 79 meeting the criterion. From these, distinct clusters emerged, encompassing thematic areas such as digital and sustainable competencies, student-centered learning, and pedagogical practices within higher education. Taken together, the heatmap illustrates how these clusters converge to underscore current research priorities in the field of skills development.

Figure 2
Keyword co-occurrence heatmap



An analysis of international co-authorship patterns was undertaken to determine which countries have been most active in publishing research on 21st century skills in higher education. Bibliometric networks were generated using VOSviewer (Van Eck & Waltman, 2010). Thresholds were set to include only those countries with a minimum of three documents and at least one citation. Of the 79 countries represented in the dataset, 43 satisfied these criteria. For each country, VOSviewer calculated the total strength of co-authorship links with other countries. The largest set of connected

countries comprised 40 nations, which were subsequently organized into five primary clusters, as presented in Table 1.

Table 1

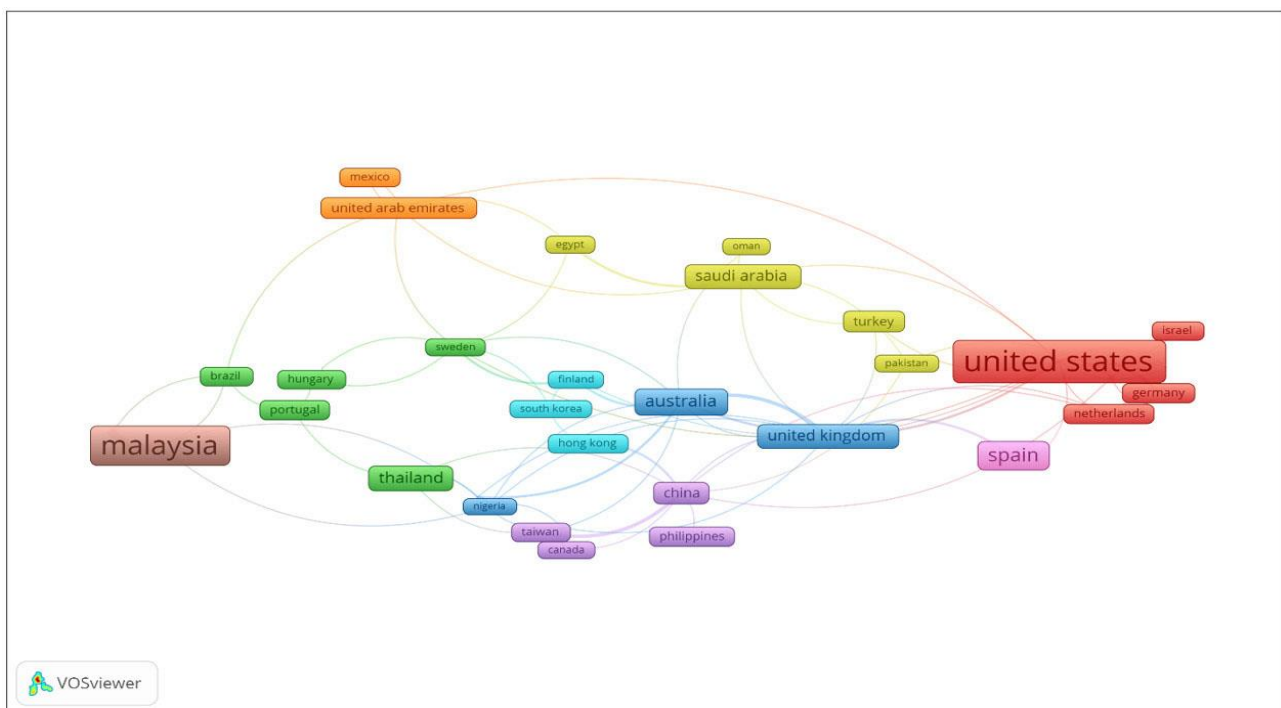
Prominent clusters of countries co-authorship

Cluster	Frame color	Countries
1.	Red	Germany, Israel, Kazakhstan, Netherlands, Russian Federation, Slovenia, Ukraine, and the United States
2.	Green	Brazil, Hungary, Italy, Portugal, Sweden, and Thailand
3.	Blue	Australia, the United Kingdom, Nigeria, South Africa, Ireland, and New Zealand
4.	Yellow	Egypt, Oman, Pakistan, Saudi Arabia, Turkey, and Vietnam
5.	Purple	Canada, China, the Philippines, and Taiwan

Figure 3 presents a visualization of the co-authorship networks among countries contributing to research on 21st century skills in higher education. In the figure, different colors are used to denote cluster membership, while the size of each frame corresponds to the number of publications, with larger frames indicating greater research output.

Figure 3

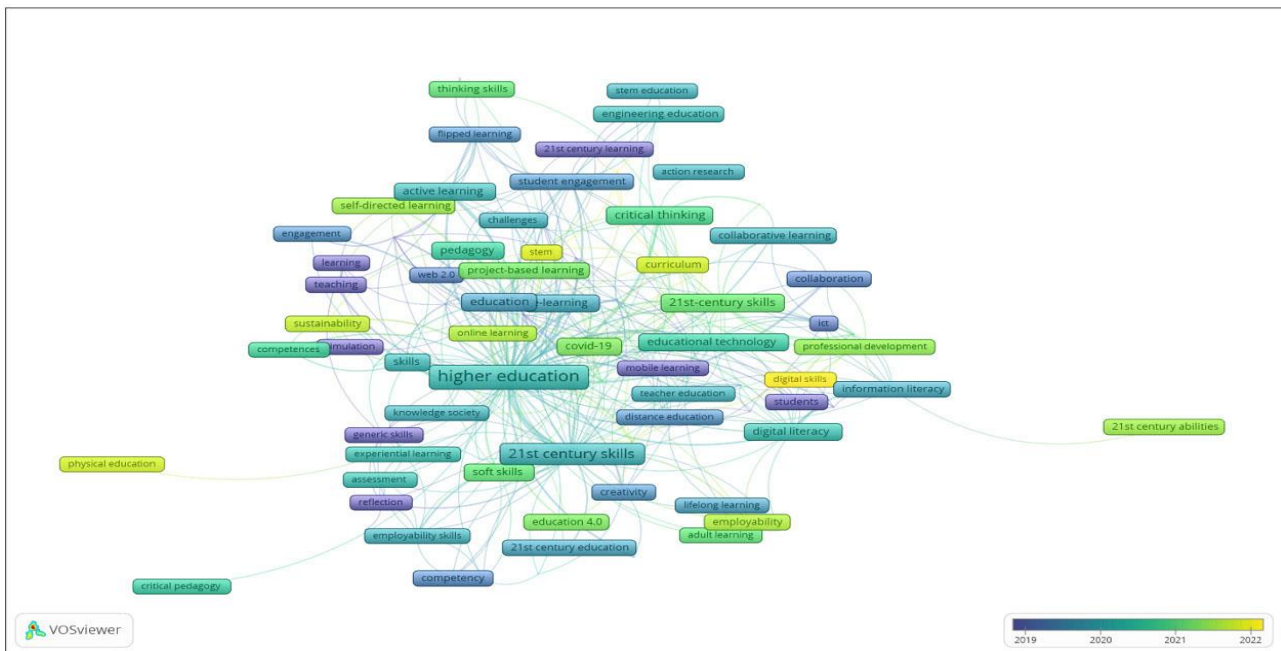
Country co-authorship network analysis



To gain a clearer understanding of the thematic contours within the literature, a keyword analysis was undertaken using VOSviewer, with attention to how authors' chosen terms connect across studies on 21st century skills in higher education. The objective was to identify frequently co-occurring terms and to discern emerging directions in the field (Van Eck & Waltman, 2010). A minimum threshold of three occurrences was applied, reducing the initial pool of 1,399 keywords to 93. For each term, VOSviewer calculated the strength of its co-occurrence links with others, revealing a densely connected network of 92 items. These were subsequently organized into 12 thematic clusters, encompassing areas such as higher education, active learning, sustainable development, technology, student engagement, self-directed learning, and teaching practices.

The most frequent keywords were higher education (171 link strength, 104 occurrences) and 21st century skills (67, 49). Other notable terms included critical thinking of 20 and 15 occurrences, and active learning, which showed 19 and 10. Soft skills revealed 17 and 8, collaboration 10 and 6, creativity 9 and 7, and online learning 9 and 4. Education 4.0 and lifelong learning both had lower values, at 5 link strength with 5 and 4 occurrences respectively. Figure 4 illustrates the network mapping, where colors represent clusters and frame sizes indicate keyword frequency. The visualization also reflects publication activity between 2019 and 2022, showing how research priorities have evolved.

Figure 4
Keyword co-occurrence network visualization



Discussion

This section considers how the findings relate to both heutagogy and the P21 Framework. The spread of publications across different subject areas reflects a mix of disciplinary priorities and individual research interests, suggesting that the data should be interpreted with some caution. That said, the results point to a broader institutional effort within higher education to prepare students with the kinds of competencies that support human capital development (Tajudin et al., 2020). This work is likely to carry on evolving as new technologies emerge and societal needs shift (Blaschke & Hase, 2016).

What comes through clearly is the need for teaching approaches that actively foster 21st century skills. The P21 Framework, with its emphasis on the 4Cs, has already found application in higher education settings (Borrowski, 2019). Heutagogy builds on this by encouraging learners to take greater ownership of their development through self-determined learning (Blaschke & Hase, 2016). At the same time, recent reviews of the literature highlight the growing role of technology in shaping how future professionals are trained, with digital tools increasingly seen as central to competency development (Aver et al., 2021; Simeunovic et al., 2022).

The bibliometric analysis of 21st century skills revealed that while the four core competencies are well established in certain subject areas, they appear less developed in fields such as Business and Management, Mathematics, and Medicine. This uneven distribution raises important questions about how heutagogical principles might be used to create space for embedding the 4Cs across a wider range of disciplines. In light of the research question, bringing together heutagogical approaches with the P21 Framework offers a useful way forward, one that balances learner autonomy with structured competency development to extend skill building into these underrepresented areas. The findings also

point to several critical domains that warrant further attention. These include sustainability (Habets et al., 2020; Wang & Torrisi-Steele, 2023b), digital literacy (Kocak et al., 2021), and the interrelated competencies of critical thinking and problem-solving (Almulla, 2023). Together, these areas appear central to preparing graduates who are not only capable but also self-directed, equipped to navigate complexity and continue learning across the lifespan. Moreover, the evidence underscores the importance of non-linear, student-centered, reflective, and collaborative environments that enable students to strengthen their 21st century skills (Aifan, 2021; Chun & Abdullah, 2025).

The co-occurrence analysis of keywords related to self-determined learners highlighted clusters around themes such as student engagement (Bakhsh et al., 2022), technology (Voogt & Roblin, 2012), sustainable development, active learning (Blaschke, 2012), and self-directed learning (Wang & Torrisi-Steele, 2023b), while less prominent themes included medical education, higher-order thinking, competency, problem-based learning, and Education 4.0. These findings suggest the importance of identifying barriers that may limit a holistic approach to developing self-determined learners. In this regard, this points to the need for empirical studies on how heutagogical practices can be implemented alongside the P21 Framework to strengthen 21st century capabilities in higher education (Aben Ahmed, 2022; Suciati et al., 2022). The literature also points to a range of pedagogical approaches that appear well suited to fostering the kinds of competencies central to both heutagogy and the P21 Framework. Blended learning (Alamri, 2021), along with project-based and flipped learning models (Latorre-Coscolluela et al., 2021), have been shown to support skill development when implemented in environments that prioritize facilitation over direct instruction (Blaschke, 2012). These approaches create room for learner agency while still providing the structure needed to guide meaningful progress.

The analysis of country co-authorship indicated that Malaysia and the United States were among the most productive contributors to research on 21st century skills in higher education, with notable collaboration also observed between the United Kingdom and Australia. These patterns point to the value of examining institutional and national partnerships more closely, particularly in understanding how collaboration between developed and developing countries can support the preparation of active and responsible learners. The keyword co-occurrence analysis further highlighted critical skills such as creativity, soft skills, collaboration, and critical thinking, each closely tied to the development of lifelong learners and to online learning environments shaped by technologies including mobile learning, artificial intelligence, and gamification (Blaschke & Hase, 2016). Active learning emerged as a particularly significant theme, reinforcing earlier studies that positioned it as essential to the cultivation of core competencies (Blaschke, 2012; Canning & Callan, 2010). This emphasis aligns well with both the P21 Framework and heutagogical principles, which foreground learner-driven approaches to education. In contrast, terms such as Education 4.0 and lifelong learning appeared less frequently, which may reflect either limited scholarly attention or their relatively recent emergence as focal areas. Despite their lower visibility in the dataset, both remain central to discussions of self-determined learning practices (Aver et al., 2021; Blaschke & Hase, 2016; Simeunovic et al., 2022). Overall, these findings suggest the need for further exploration into how Education 4.0 and self-determined online lifelong learning intersect in the development of 21st century skills in higher education.

Conclusion

This research reviewed emerging patterns in the development of 21st century skills between 2015 and 2023 through a systematic review and bibliometric exploration. The findings provide interesting insights for Kazakhstani HEIs, showing that 4Cs skills and capabilities can be developed through heutagogical approaches and the P21 Framework in online learning environments.

The results suggest that HEIs in Kazakhstan can strengthen instructional strategies by adopting active and learner-centered practices. Heutagogical design offers a pathway for cultivating self-determined lifelong learners, while the P21 Framework provides a structured model for integrating essential competencies. In this regard, they present a coherent strategy for university faculty, curriculum designers, and academic practitioners who seek to align institutional priorities with global

educational trends and the growing importance of lifelong learning in the age of AI-powered technologies.

This study suggests that combining heutagogical teaching and learning design with the P21 Framework offers a promising foundation for promoting 21st century skills. Emerging technologies and innovative instructional practices have a central role to play in preparing students for the demands of an increasingly digital world. By embedding the four core competencies into online learning environments, universities can create spaces that encourage learner autonomy, responsibility, and adaptability. What makes this contribution distinctive is its integration of bibliometric evidence with heutagogical theory. The resulting framework provides curriculum designers, faculty, and practitioners with a practical reference for cultivating lifelong learners capable of navigating complex and evolving contexts, including those shaped by artificial intelligence, sustainability challenges, and rapid technological change.

Limitations

This study has certain limitations that should be acknowledged. One worth noting is the reliance on the Scopus database, which inevitably narrows the range of literature considered. That said, the choice was deliberate, as Scopus provides access to SciVal analytics, which made it possible to trace scholarly trends and draw out the theoretical links between heutagogy and the P21 Framework in a way that other databases may not have supported as effectively.

Future Directions

Looking ahead, several directions for future research appear worthwhile. Expanding the scope of inquiry to include additional research databases would help build a more comprehensive picture of the field. There is also room for further theoretical work aimed at refining how heutagogical design relates to the P21 Framework, particularly as both continue to evolve in response to changing educational contexts. Beyond theory, more attention could be directed toward the practical side of things, especially how these frameworks intersect with emerging areas such as artificial intelligence, digital learning platforms, and innovative instructional strategies. Exploring these connections in greater depth would enrich understanding of how higher education can bring together heutagogical principles and technological innovation. It would also contribute to ongoing conversations about lifelong learning and the role that AI powered technologies are beginning to play in shaping the future of higher education.

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ЖОҒАРЫ БІЛІМДЕГІ ЖИЫРМА БІРІНШІ ҒАСЫР ДАҒДЫЛАРЫН VOSVIEWER АРҚЫЛЫ БИБЛИОМЕТРИЯЛЫҚ ЗЕРТТЕУ

Андатпа. Бұл зерттеу 2015–2023 жылдар аралығында жоғары білімде ХХІ ғасыр дағдыларының дамуын жүйелі әдебиеттерге шолу және библиометриялық талдау негізінде қарастырады. Scopus дерекқорында тіркелген 423 мақала VOSviewer және SciVal құралдары арқылы талданды. Шолу нәтижелері P21 үлгісімен ұштасқан хьютагогикалық тәсілдердің өзіндік оқу үдерісін қолдауға және студенттердің онлайн ортада өз жетістіктеріне көбірек жауапкершілікпен қарауына ықпал ететінін көрсетті. Мұндай тәсілдер білім алушыларды өздерінің оқу жолын қалыптастыруға белсенді қатысушы ретінде орнықтырады. Библиометриялық талдау пәндер бойынша жарияланым үрдістерін, тақырыптық топтарды және жиі кездесетін түйінді сөздерді анықтап, халықаралық ынтымақтастық бағыттарын көрсетті. Нәтижелер сыни ойлау, коммуникация, ынтымақтастық және шығармашылықты онлайн жоғары білімге енгізудің маңызын айқындайды және оқытушылар мен оқу бағдарламасын әзірлеушілер үшін, әсіресе қазақстандық университеттер жағдайында, практикалық қолданысқа бағыт береді. P21 үлгісіне негізделген хьютагогикалық стратегиялар студенттерді өмір бойы оқуға дайындаудың бір жолы ретінде ұсынылады.

Түйін сөздер: ХХІ ғасыр дағдылары, хьютагогика, P21 үлгісі, жоғары білім, Қазақстан

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БИБЛИОМЕТРИЧЕСКОЕ ИССЛЕДОВАНИЕ НАВЫКОВ ХХІ ВЕКА В ВЫСШЕМ ОБРАЗОВАНИИ С ИСПОЛЬЗОВАНИЕМ VOSVIEWER

Аннотация. В данном исследовании рассматривается продвижение навыков ХХІ века в высшем образовании в период с 2015 по 2023 годы на основе систематического обзора литературы и библиометрического анализа. Всего было изучено 423 статьи, индексированные в базе Scopus, с применением инструментов VOSviewer и SciVal. Обзор выявил потенциал хьютагогических подходов, которые в сочетании с рамочной моделью P21 способны поддерживать самоопределённое обучение и стимулировать студентов к большей ответственности за собственный прогресс в онлайн-среде. Эти подходы позволяют позиционировать обучающихся как активных участников в формировании собственных образовательных траекторий. Библиометрический анализ отследил публикационные тенденции по дисциплинам, выявил тематические кластеры и часто встречающиеся ключевые слова, а также отразил модели международного сотрудничества. Результаты подчёркивают важность интеграции критического мышления, коммуникации, сотрудничества и креативности в онлайн-образование, что имеет практическое значение для преподавателей и

разработчиков учебных программ, особенно в контексте казахстанских университетов. Хьютагогические стратегии, основанные на модели Р21, предлагаются как один из способов подготовки студентов к обучению на протяжении всей жизни в условиях постоянно меняющейся образовательной среды.

Ключевые слова: Навыки XXI века, хьютагогика, рамочная модель Р21, высшее образование, Казахстан

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