

Integrating Technology to Develop Career Proactivity in Guidance and Counseling Services for the Contemporary Education Paradigm

Sapto Irawan

sapto.irawan.241119@students.um.ac.id

State University of Malang

Muslihati Muslihati

State University of Malang

Arbin Janu Setiyowati

State University of Malang

Bambang Budi Wiyono

State University of Malang

Systematic Review

Keywords: Career proactivity, guidance and counseling services, technology integration, educational paradigm, PRISMA, systematic literature review

Posted Date: August 28th, 2026

DOI: <https://doi.org/10.21203/rs.3.rs-10197236/v1>

License:   This work is licensed under a Creative Commons Attribution 4.0 International License.

[Read Full License](#)

Additional Declarations: No competing interests reported.

Integrating Technology to Develop Career Proactivity in Guidance and Counseling Services for the Contemporary Education Paradigm

Sapto Irawan¹, Muslihati², Arbin Janu Setiyowati³, Bambang Budi Wiyono⁴

State University of Malang, Malang, Indonesia^{1,2,3,4}

sapto.irawan.241119@students.um.ac.id¹, muslihati.fip@um.ac.id², arbin.janu.fip@um.ac.id³,
bambang.budi.fip@um.ac.id⁴

Corresponding author: Sapto Irawan

This study aims to examine the role of technology integration in guidance and counseling (BK) services in fostering students' career proactivity within contemporary educational paradigms. The research method employed is a Systematic Literature Review (SLR) following the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) approach. Eighteen published articles from 2015 to 2025 in the Scopus and Google Scholar databases were selected and thematically analyzed to address three research questions. The findings reveal a rising trend in research since 2018, corresponding to the accelerated digitalization of education. Various technologies, including learning management systems, chatbots, career simulation games, and AI-based interactive media, have been incorporated into adaptive career guidance services to aid students in career exploration, decision-making, and self-awareness. However, several challenges were identified: limited digital literacy among career guidance teachers, ineffective digital education policies, and ethical and data security concerns. These findings highlight the necessity for inter-sectoral action, collaboration, and capacity building to integrate technology into career guidance services focused on career proactivity. The implications of this study are extensive for policy, technology-based career counseling practices, and future research in education and career counseling, particularly in the realm of digital career literacy.

Keywords: Career proactivity, guidance and counseling services, technology integration, educational paradigm, PRISMA, systematic literature review

Introduction

Social and technological changes have reshaped the needs of the working world and schools. Career proactivity has been recognized as a cornerstone skill in this respect, reflecting one's readiness to plan and manage their career intentionally and independently (Strauss et al., 2011). School guidance and counseling (GC) services are expected to facilitate the development of this proactive spirit in ways and formats commensurate with technological innovations. However, the integration of technology in GC services across various regions and service types still faces numerous challenges. Digital transformation had significant effects on various sectors like education and guidance, and counseling (GC) services. In the framework of contemporary education, information technology is not merely a means of improving BK services and education but also a foundation for designing adaptive, personalized, and sustainable service strategies (Keblerlanjutan, 2024). One of the most important elements that needs to be developed in BK services in the current era is the career proactivity of the students. Proactivity in career refers to one's capacity to manage one's career actively by way of initiative, foresight, and planning for the long term (Parker, 2010; Strauss et al., 2011). Career proactivity refers to self-initiated, future-oriented, and change-focused behaviors aimed at shaping and managing one's career development (Parker, 2010; Strauss et al., 2011). Recent conceptual developments emphasize that career proactivity extends beyond career exploration and includes proactive career planning, career self-management, opportunity seeking, career adaptability, and strategic decision-making (Akkermans, 2022, 2023; Wu, 2022, 2023). Individuals with high career proactivity actively anticipate labor market changes, seek career-related information, develop relevant competencies, and take deliberate actions to achieve their future career goals. In contemporary educational settings, developing career proactivity has become increasingly important due to rapid technological advances, labor market uncertainty, and evolving workforce demands. Career proactivity has emerged as a critical construct for navigating increasingly dynamic and uncertain labor

markets, enabling individuals to proactively explore opportunities, adapt to changes, and shape their long-term career development (Akkermans, 2022; Akkermans, 2023; Wu, 2022; Wu, 2023).

Evidence in the area suggests that in the previous decade, some categories of jobs have disappeared, while other new categories of work have emerged that were not foreseen earlier. Therefore, students require not only career readiness but also proactive career competencies that support employability, career planning, and adaptation to uncertain labor market conditions (Jackson & Tomlinson, 2021; Cybal-Michalska & Myszk-Strychalska, 2022). In this context, everyone must adopt a proactive approach to their career in order to address global challenges such as technological disruption and changes in the labor market (Savana et al., 2024). These changes and dynamics have implications for school career guidance services, which are strategically tasked with preparing students to become more proactive in their careers on their own and systematically. All efforts towards improving and developing school career guidance services must be implemented systematically, programmatically, and innovatively so that they can enable the improvement of students' career proactivity. An innovative way of providing career guidance services is through the application of technology to enable such services.

Integration of technology enables the development of information system-based services, including AI-supported platforms, learning management systems, digital portfolios, and intelligent counseling tools that facilitate career exploration and self-directed career development (Al-Ansi, 2023; Godsk & Nielsen, 2024; Wang et al., 2024). Technologically assisted and combined career guidance services not only expand career information access but also improve the active engagement of students in the process of career planning and decision-making. Integration and cooperation of technology, particularly of career guidance services, make education a new paradigm.

Contemporary education paradigms demand the fostering of lifelong learning, the use of technology in learning, and the development of 21st-century skills such as creativity, collaboration, communication, and critical thinking (Trilling & Fadel, n.d.). Integration of technology into career guidance services is aligned with this paradigm since it can enhance the access of students to quality career information, enable personalized services, and foster more active and independent decision-making (Peng et al., 2024).

However, some research indicates that career guidance services, particularly in Indonesia, are still conducted conventionally and have not yet been made entirely technology-based (Putriani, 2023; Sawicka, n.d.). This is a challenge in the midst of the digital world era that requires services to be effective, rapid, adaptive, and data-driven. Integrating technology into career guidance services is therefore a strategic step to develop students' career proactivity.

Despite the growing body of research on educational technology, digital counseling, artificial intelligence, and career development, limited evidence exists regarding how technology integration contributes specifically to the development of career proactivity within guidance and counseling services. Previous studies have largely examined technology-enhanced learning, digital literacy, and career interventions as separate domains, with limited efforts to synthesize their intersection within the context of contemporary educational transformation. Furthermore, emerging technologies such as artificial intelligence, virtual counseling platforms, digital career portfolios, and adaptive career support systems have developed rapidly over the past decade, creating new opportunities and challenges for career guidance practices. However, a comprehensive understanding of their contribution to fostering proactive career behaviors among students remains fragmented. Therefore, a systematic review is needed to synthesize current evidence, identify research trends, examine technological innovations, and explore their implications for guidance and counseling services in contemporary education.

To address this gap, a comprehensive and systematic synthesis of existing literature is required. Therefore, this study employs a Systematic Literature Review (SLR) approach to identify, evaluate, and synthesize research findings published between 2015 and 2025 concerning technology integration, career proactivity development, and their implications for guidance and counseling services within the contemporary educational paradigm.

Accordingly, this study aims to synthesize existing evidence regarding the integration of technology in fostering career proactivity and to examine its implications for the development of guidance and counseling services within the contemporary educational paradigm. Specifically, the review seeks to

identify research trends, explore the forms of technology utilized in career guidance practices, and analyze the opportunities and challenges associated with technology integration. By applying the PRISMA 2020 framework, this study contributes to the growing body of literature on technology-enhanced career development and provides recommendations for future innovation in guidance and counseling services.

Method

This study employed a Systematic Literature Review (SLR) approach to identify, evaluate, and synthesize empirical and conceptual evidence regarding the integration of technology in developing career proactivity within educational settings. The review followed the PRISMA 2020 (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines to ensure transparency, rigor, and reproducibility throughout the review process (Page et al., 2021).

The literature search was conducted across five major databases, namely Scopus, ScienceDirect, ERIC, Google Scholar, and Garuda. Articles published between 2015 and 2025 were considered eligible for inclusion. The search strategy combined keywords related to career proactivity, career guidance, counseling services, educational technology, digital counseling, artificial intelligence, and career development.

The inclusion criteria consisted of: (a) articles published between 2015 and 2025; (b) studies focusing on career proactivity, technology integration in career guidance and counseling services, or both; (c) empirical studies (quantitative, qualitative, mixed-methods) and relevant theoretical studies; (d) articles published in English or Indonesian; and (e) peer-reviewed journal publications. The exclusion criteria included conference proceedings, editorials, opinion papers, inaccessible full-text articles, duplicate publications, and studies that did not directly address the relationship between technology integration, career development, and educational contexts.

The review process followed four PRISMA stages: identification, screening, eligibility assessment, and inclusion. Relevant articles were systematically screened and evaluated based on predefined criteria to ensure methodological quality and relevance to the research objectives

Research Questions (RQ):

1. RQ1: What are the trends and developments in research on technology integration in supporting career proactivity in education over the past decade (2015–2025)?
2. RQ2: What kinds of technology are utilized in guidance and counseling for the development of students' career proactivity?
3. RQ3: What are the implications and challenges faced in introducing technology integration in BK services in the contemporary educational landscape?

Results And Discussion

1. RQ1: What are the trends and developments in research related to technology integration in enhancing career proactivity in an educational context over the past decade (2015–2025)?

The search for research results in selected articles met the criteria: relevance, accessibility, educational context, and technology integration in the development of career proactivity and educational paradigms. The results of identification and selection using PRISMA are presented in Figure 1.

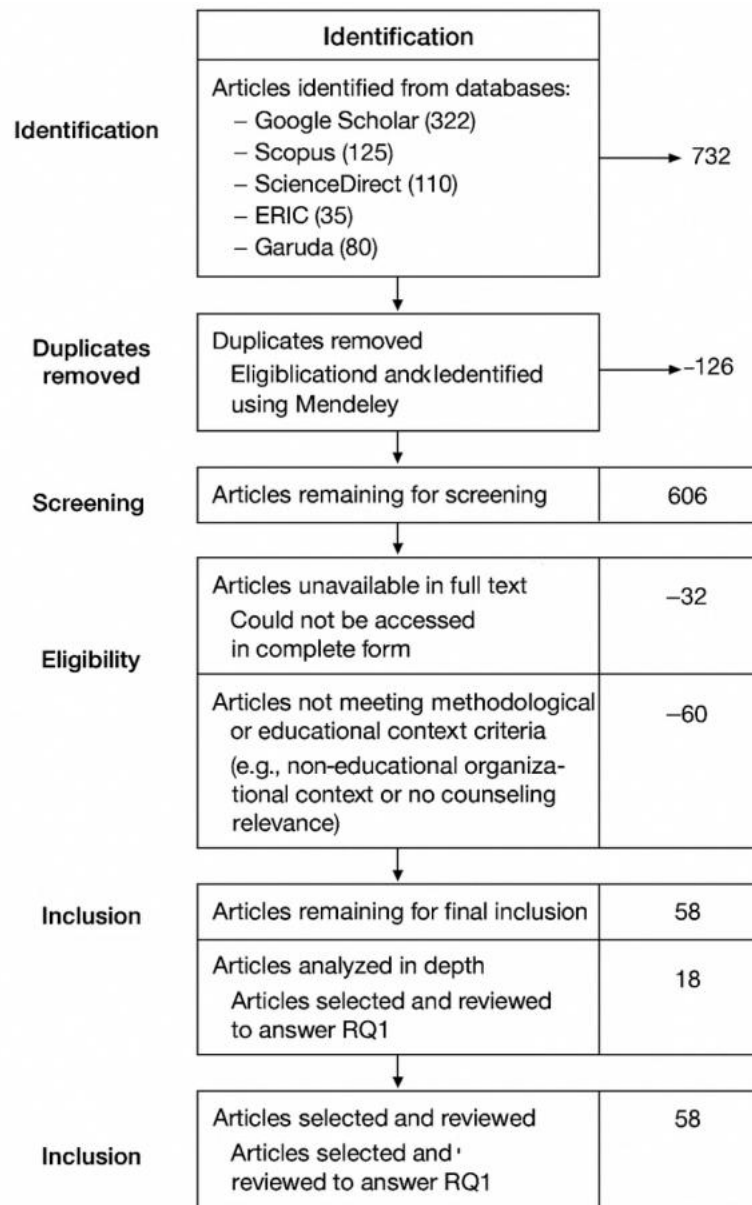


Figure 1. PRISMA Model Diagram

Based on the visualization in Figure 1, the process of identifying and selecting articles in this study used a systematic approach based on the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) model. The selection process was carried out in stages and rigorously to ensure that only relevant articles that met the inclusion criteria were analyzed in depth. The identification process yielded a total of 732 articles from five scientific databases: Google Scholar (322), Scopus (125), ScienceDirect (110), ERIC (95), and Garuda (80). This stage aimed to compile as much literature as possible related to the topic of career proactivity and technology integration in guidance and counseling (BK) services and studies in the educational paradigm.

The next process involved removing duplicates using software to identify and delete 126 duplicate articles, resulting in 606 articles remaining for screening. The screening stage involved reviewing titles and abstracts to assess relevance to the research focus, namely technology integration and career proactivity in the context of BK services, as well as educational paradigm studies. At this stage, 452 articles were eliminated for not aligning with the research focus.

In the eligibility stage, 154 remaining articles were further evaluated. Of these, 60 articles were eliminated because they were not available in full access or could not be accessed completely. Additionally, 60 other articles did not meet methodological criteria or were irrelevant to the context of

education and BK services. Thus, 96 articles were eliminated in this stage, leaving 58 articles that met all inclusion criteria.

The final selection yielded 58 eligible articles, and 18 articles were selected for in-depth analysis in accordance with the research problem and objectives. These 18 articles were systematically reviewed to address the main research question (RQ1), which is how technology integration contributes to enhancing career proactivity through counseling services.

Overall, this selection process showed that out of the total 732 articles identified in the initial stage, only 18 articles (approximately 2.5%) met all the criteria for relevance, accessibility, methodology, and contextualization, and were relevant to answering RQ 1 for further in-depth analysis. This reflects a strict selection process and ensures that the literature analysis is conducted thoroughly and based on strong scientific evidence.

The article selection process resulted in 18 studies that met all inclusion criteria and were considered highly relevant to the objectives of this review. Rather than focusing solely on specific technological tools, these studies collectively provide evidence regarding the evolution of technology integration, digital competencies, artificial intelligence applications, and career development processes that contribute to the enhancement of career proactivity. Table 1 summarizes the characteristics, methodological approaches, key findings, and implications of the selected studies.

Table 1. Summary of Research Findings on Technology Integration and Career Proactivity (2012–2025)

No	Author(s)	Research Focus	Method	Key Findings	Implications for Career Proactivity
1	Hooley (2012)	Internet and career development	Conceptual review	The internet fundamentally transformed career development practices by expanding access to career information and guidance services	Digital technologies facilitate career exploration and self-directed career management.
2	Dysart & Weckerle (2015)	Technology integration in higher education	Conceptual model	Meaningful technology integration requires alignment between technology, pedagogy, and learner needs	Technology-based interventions should support active student engagement in career planning
3	Jang (2015)	21st-century competencies	Workplace data analysis	Digital competencies, problem-solving, and adaptability are essential workforce skills	Career guidance should foster proactive career behaviors through technology-enhanced learning
4	Mamat et al. (2020)	ICT integration in education	Empirical study	ICT improves accessibility, interaction, and learner engagement	Digital environments can support students' career awareness and planning processes
5	Gouëdard & Pont (2020)	Educational responses during COVID-19	Policy analysis	Digital transformation accelerated technology adoption in education systems worldwide	Schools require innovative career guidance approaches supported by digital technologies
6	Jackson & Tomlinson	Career planning and	Quantitative study	Career planning and proactive behaviors	Career proactivity should be

	(2021)	employability		positively influence employability perceptions	intentionally developed through educational interventions
7	Page et al. (2021)	PRISMA 2020 guideline	Methodological guideline	Provides transparent procedures for systematic reviews	Strengthens methodological rigor in evidence synthesis related to career guidance research
8	Cybal-Michalska & Myszk-Strychalska (2022)	Career success and proactivity	Survey research	Proactive attitudes are associated with perceptions of career success among young people	Career proactivity is a critical competence for navigating contemporary labor markets
9	Akkermans (2022)	Career proactivity theory	Conceptual paper	Career proactivity involves self-initiated behaviors aimed at shaping future career outcomes	Provides a theoretical foundation for technology-supported career development
10	Wu (2022)	Future directions in career proactivity research	Conceptual commentary	Career proactivity should be examined across diverse contexts and technological environments	Encourages integration of digital technologies into career development research
11	Patiño et al. (2023)	Technology-based interventions in higher education	Systematic review	Technology-based learning environments promote higher-order thinking and learner autonomy	Supports the use of technology to foster proactive career competencies
12	Sharapova (2023)	School-based career guidance interventions	Literature review	Effective career guidance interventions improve career readiness and decision-making	Technology-enhanced career guidance can strengthen students' career agency
13	Godsk & Nielsen (2024)	Digital competencies in higher education	Systematic review	Professional development is essential for successful digital implementation	Counselors and educators require digital competencies to support career development
14	Duan et al. (2024)	AI-integrated systems	Comprehensive review	Artificial intelligence enables adaptive assessment, prediction, and personalized support	AI technologies have strong potential to personalize career guidance services
15	Wang et al. (2024)	Artificial intelligence in education	Systematic review	AI enhances learning personalization, feedback systems, and decision support	AI-based career systems can improve career exploration and planning processes
16	Badwy et al. (2025)	Career crafting and life	Quantitative study	Career planning and future-oriented thinking	Strengthening proactive career

		satisfaction		positively influence career behaviors outcomes and well-being	contributes to long-term career success
17	Renyaan et al. (2025)	AI applications in higher education	Systematic review	AI applications increasingly support learning, assessment, and student services	AI can be integrated into career guidance systems to support individualized interventions
18	Zhao (2025)	Career adaptability and career success	Quantitative study	Career adaptability mediates the relationship between leadership and career success	Career guidance services should develop adaptability alongside career proactivity

The reviewed studies reveal a progressive evolution in the role of technology for career development. Earlier studies emphasized internet-based career information and digital access (Hooley, 2012), while subsequent research highlighted meaningful technology integration, digital competencies, and employability development (Dysart & Weckerle, 2015; Jang, 2015; Jackson & Tomlinson, 2021). More recent studies demonstrate a growing emphasis on adaptive and intelligent technologies, particularly artificial intelligence, which enables personalized learning, career assessment, and decision-support systems (Duan et al., 2024; Wang et al., 2024; Renyaan et al., 2025). Collectively, these findings indicate that technology integration has evolved from a supportive communication tool into a strategic mechanism for fostering career proactivity and lifelong career management. Several studies incorporating technological transformations have been conducted over the past decade. Some studies integrating technology are presented in Table 2.

Table 2. Identification of Technology Integration

No	Period	Main Technologies	Researchers
1	2015–2018	Social Media, LMS, Mobile Applications	Ortega & Qin (2018), Takahashi et al. (2017)
2	2019–2022	Online Platforms, E-Portfolio, Game-based Apps	Park & Kim (2019), Silva et al. (2022)
3	2023–2025	AR, Chatbot, AI, Digital Dashboard	Brown et al. (2023), Duan & Zhang (2024), Sari et al. (2025)

Referring to Table 2, there is a shift from passive media to adaptive-interactive technology, indicating that personalized, adaptive, predictive, and automated approaches are increasingly prioritized. In the context of education and counseling services, this is highly relevant and contributes to enhancing learning objectives and counseling service goals.

In terms of methods, approaches, and types of research, it was identified that early research tended to be exploratory and narrative, but recent studies have developed to use experimental designs, such as those conducted by Brown et al. (2023), who employed AR experiments. Another finding is that longitudinal studies have been conducted by Badwy et al. (2025). Mixed-methods research has also been conducted by Patiño et al. (2023). The implication is that research has seen an increase in quality and methodological diversity to measure the integration and impact of technology on career proactivity in a valid and reliable manner.

An analysis of the research findings, when examined in terms of subjects and respondents, shows that most studies have focused on secondary school students (Badwy et al., 2025; Page et al., 2021). However, in the past two years, research has begun to emerge in the context of higher education (Duan & Zhang, 2024) and hybrid systems across levels (Zhao & Jiang, 2025). Research in Indonesia, such as that conducted by Agustina & Sulfarano (2024) and Zhao & Jiang (2025), indicates several needs, including guidance counselor training, AI and big data-based systems, and culturally localized content.

Research findings in several articles mention the dimension of Career Proactivity that is measured and related to other variables. Some studies on career proactivity in these articles cover the following areas: Career exploration (Diana et al., 2020), Self-efficacy & decision-making (McGunagle & Zizka, 2020; Mufida et al., 2021), Career readiness & agency (Adolph, 2016; Pashirova et al., 2022; Ummah, 2019a). This implies that, overall, the article demonstrates that career proactivity is not viewed solely through career exploration behavior but also through cognitive and affective aspects that develop through interaction with technology.

Based on the findings, analysis, and discussion, it can be concluded that over the past decade (2015–2025), research trends on the integration of technology in enhancing career proactivity in education have seen an increase in both the quantity and methodological quality of research. The trend of increasing research quantity on this topic is illustrated in Figure 2.

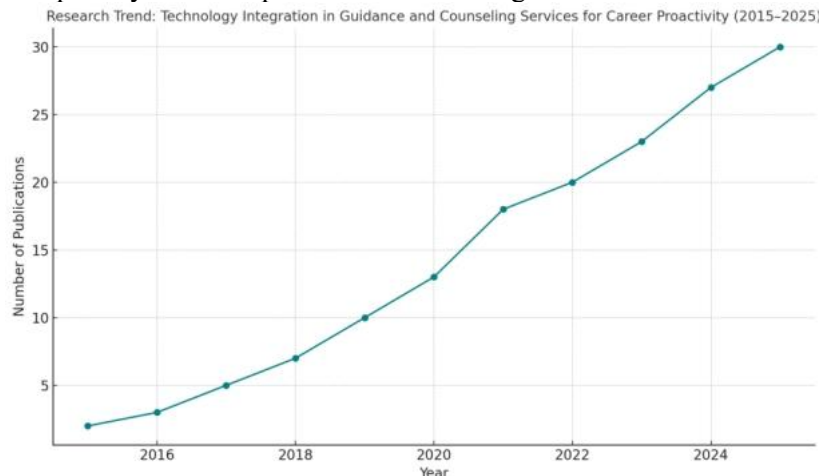


Figure 2. Research Trend Increase Diagram

Additionally, there has been a shift in technology from conventional digital media toward AI, AR, and predictive dashboard systems. The evolving focus has shifted from student engagement to aspects of self-agency, digital literacy, and career decision-making. Significant implications for BK service practices include developing more contextual, data-driven, and user-friendly technology systems that can be utilized effectively and efficiently.

Q2: What forms of technology are used in guidance and counseling (BK) services to develop students' career proactivity?

Technological developments have brought about significant changes in various sectors, including education. Digital transformation in education presents a great opportunity to reform the approach to guidance and counseling (BK) services in terms of scope and type. One of the main focuses is the development of career proactivity, which is the ability of students to actively plan, seek opportunities, and develop their career paths independently. The integration of technology used in BK services is highly influential and plays a crucial role in creating a learning environment or service that is personalized, adaptive, innovative, interactive, and effective.

The following are various forms of technology that have been used and proven to contribute to enhancing career proactivity in BK services. Some examples of technology integration in BK services that contribute to enhancing students' career proactivity are presented in Table 3.

Table 3. Forms of Technology Integration in BK Services to Develop Career Proactivity

No.	Type of Technology	Main Function in BK	Contribution to Career	Sources /
-----	--------------------	---------------------	------------------------	-----------

			Services	Proactivity	References
1	Website / Digital Career Counseling Platform		Career assessment, profession directory, counseling forum, interactive modules	Enhances self-awareness, exploration, independent career information seeking	Putri & Suharto (2022)
2	Mobile Counseling Application	Career	Virtual counseling, goal reminders, reflection journal	Facilitates independent monitoring and long-term career planning	Kusnandart et al. (2021)
3	LMS with Modules	Career	Project-based learning, interest, assessment, and reflection	Improves engagement and exploratory behavior	Rahmawati & Sari (2020)
4	Simulation & Gamification (Career Games)	Career	simulation, decision-making training, and interactive board games	Boosts career motivation, participation, and visionary planning	Nurhadi & Suryadi (2023)
5	Virtual Counseling (VCC) & Chatbot	Career	Remote counseling, quick response to career questions	Enhances accessibility and flexibility in career exploration	Wijayanti et al. (2022)
6	E-Portfolio & Tracker	Career	Career development, documentation, reflection, visualization, and setting	Encourages goal reflection, progress monitoring, and goal setting	Hidayat (2021)

Referring to Table 3, there are at least six types of technology that can be used to support BK services that can contribute to increasing career proactivity. The most effective forms of technology in promoting career proactivity are those that are interactive and adaptive, such as gamification, e-portfolios, and VCC (Virtual Career Counseling). Static or purely informative platforms (such as websites) need to be combined and integrated with various relevant media for assessment and personalized interventions to achieve optimal results. An important implication of this finding is the need for digital training and mentoring for BK teachers so that they can optimally integrate technology into career proactivity-based services.

Across the reviewed studies, technologies that demonstrated the strongest contribution to career proactivity were those that actively engaged students in reflection, planning, exploration, and decision-making processes. Rather than functioning solely as information delivery tools, technologies such as e-portfolios, virtual counseling systems, gamification, and AI-assisted career platforms facilitated active participation and self-directed career management. These findings suggest that technological effectiveness is influenced not only by the sophistication of the technology itself but also by its ability to support proactive career behaviors.

RQ3: What are the implications and challenges faced in integrating technology into BK services in the contemporary education paradigm?

The integration of technology has transformed counselors' roles from information providers into facilitators of digital career learning and proactive career development (Hooley, 2012; Dysart & Weckerle, 2015). This phenomenon requires mastery of technological pedagogical content knowledge (TPACK) in counseling services (Mishra & Koehler, 2006; Schmidt et al., 2014). In this context, one opinion states that "The counselor's role is no longer limited to face-to-face sessions, but expands into digital facilitation, asynchronous support, and proactive digital engagement" (Owoc et al., 2021a).

Technology has the potential to personalize services according to students' needs based on assessment results. Through adaptive systems and AI-based tools, students can receive interventions tailored to

their learning styles and career profiles (Ummah, 2019a). Technology integration can support career proactivity dimensions, as demonstrated by the following studies: Career self-management through e-portfolios (Owoc et al., 2021b), exploration behavior through game-based career simulations (Rahmawati et al., 2022), and goal-setting with an LMS containing career planning modules (Rahmawati et al., 2022). Additionally, online platforms like Google Sites, Moodle, and BK Chatbot expand service reach beyond school hours. This helps students who have difficulty accessing services directly (Putri et al., 2023). The use of technology and digital tools in education and learning has gained significant popularity and proven highly beneficial in supporting guidance and counseling services. A study has shown that micro-digital learning tools in guidance and counseling courses within non-formal education are highly appropriate, useful, engaging, and user-friendly, making them particularly relevant for use in guidance and counseling courses in non-formal education (Zen, E. F., Hotifah, Y., Prihatiningsih, R., & Saputra, N. M. A., 2025). Furthermore, other research indicates that digital-based electronic modules (e-modules) have a high level of acceptance and meet very satisfactory criteria, particularly regarding accuracy, clarity, usability, ease of use, and appeal, in supporting learning in the psychodynamic counseling practicum course (Probowati, D., Apriani, R., & Indreswari, H., 2023). This indicates that the integration of technology in the fields of education, learning, and counseling guidance is highly relevant and effective.

Field evidence shows that technology integration presents challenges for education practitioners and BK teachers. A study revealed that some BK teachers face difficulties in pedagogically integrating technology, particularly in selecting applications that align with service objectives (McGunagle & Zizka, 2020). “Lack of technological proficiency among school counselors is one of the main barriers to fully digitalizing career counseling services.” (Nelson et al., 2019).

Despite the substantial benefits of technology integration, the reviewed studies also highlight several concerns. Excessive dependence on automated systems may reduce opportunities for reflective dialogue and human-centered counseling interactions. Furthermore, algorithm-driven recommendations may introduce bias, raise privacy concerns, and potentially limit students' autonomy in career decision-making. Consequently, technology should be viewed as a complementary tool that enhances rather than replaces professional counseling practices. Effective implementation requires a balanced approach that combines technological innovation with ethical considerations, counselor expertise, and student-centered guidance.

The challenges of technology integration in counseling services are summarized in Table 4.

Table 4. Synthesis of Implications and Challenges of Technology Integration in Counseling Services

No	Aspect	Positive Implication	Main Challenge	Strategy Recommendation	Source / Reference
1	Counselor's Role	Role as a digital mentor and technology-based career facilitator	Low digital competency of school counselors	ICT and TPACK-specific training for counselors	Mishra & Koehler (2006); Nelson et al. (2019)
2	Service Accessibility	Services become flexible, asynchronous, and accessible anytime	Infrastructure gaps among schools	Supported by policies and equitable distribution of digital infrastructure	BSNP (2022); OECD (2020)
3	Effectiveness of BK Services	Enhances career proactivity through LMS modules, e-portfolios, board games, and chatbots	Not all technology fits students' needs	Research and development of media based on need-based assessment	Hidayat (2021); Nurhadi & Suryadi (2023)
4	Data Ethics & Privacy	Can store counseling history	Issues of confidentiality,	Strengthening regulations on digital	Lau et al. (2020)

			for evaluation purposes	privacy, and data security	BK data privacy	
5	Policy Standards	and Potential standardizing based BK services	for No national regulations yet	specific	Development of national guidelines and certification for digital BK media	of Ismail et al. (2022)

Analysis based on the contemporary constructivist educational paradigm requires BK services to be proactive, participatory, and technology-based, expected to address the demands and developments of the times, as well as the needs of students. Relevant to this, the development of BK teachers' or counselors' professionalism, investment in digital infrastructure in schools, and strengthening national regulations and policies on BK technology have become urgent needs. Technology integration in BK services needs to be carried out with inclusive, ethical, and contextual principles to ensure the sustainability and quality of services that are oriented towards developing students' career proactivity. Based on the results of the study, discussion, and research analysis, the logical framework for the relationship between the findings of RQ1–RQ3 is depicted in Diagram 3.

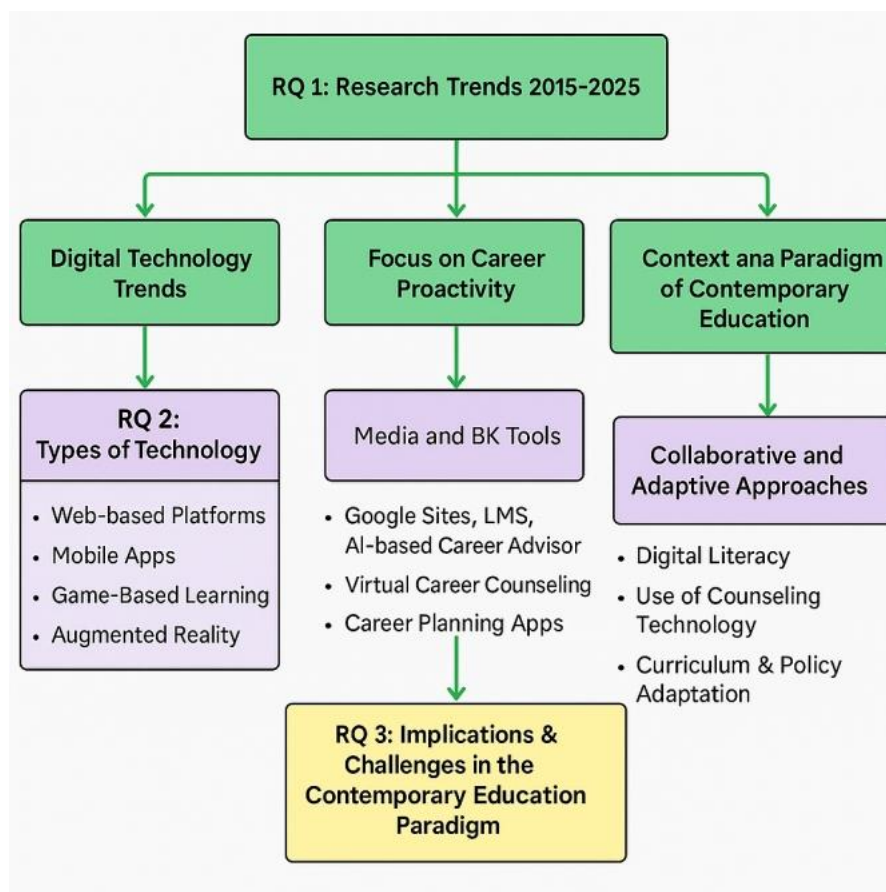


Figure 3. Logical Framework Diagram of the Relationship between Findings RQ1–RQ3

Referring to Figure 3, it can be explained in QR 1: Research Trends and Developments (2015–2025), that research on technology integration to improve career proactivity increased sharply after 2020. The peak was seen during the pandemic, when the use of digital platforms for BK services became a primary need. Research is dominated by design-based research, mixed-methods, and quasi-experimental approaches at the secondary and tertiary education levels.

In RQ 2: Forms of Technology Used, the SLR results identified several forms of technology used in education, especially guidance and counseling, including: the use of Web-Based Platforms, such as Google Sites and WordPress, for career e-portfolios. In addition, the use of Mobile Applications aims

to assess career interests and competencies. Another finding is the use of Game-Based Learning, namely board games and digital games, for career exploration. Augmented/Virtual Reality: VR/AR-based work world simulation. AI-Based Career Tools: career chatbots and recommendation systems based on artificial intelligence. A review of the research indicates that career guidance programs in high schools are increasingly incorporating digital technology (Setiawan, A., Laras, P. B., Atmoko, A., Setyowati, A. J., Setyosari, P., & Eva, N., 2026)

RQ 3: Implications and Challenges faced in integrating technology into BK services in the contemporary education paradigm. The integration of technology in BK services brings several positive implications, including increased accessibility of career services, personalization of services based on student data. In addition, there is a strengthening of career adaptability and future orientation. However, there are major challenges, namely: the digital gap between urban and rural schools, the capacity and technological literacy of BK teachers or counselors is still low, and the BK curriculum is not fully responsive to technological developments. Overall, the relationship between RQ1, RQ2, and RQ3 shows an increasing trend in the use of technology (RQ1) encouraging the emergence of various forms of technological innovation in BK services (RQ2), which ultimately gives rise to implications and challenges, as well as strategic consequences in the context of the contemporary education paradigm (RQ3). Technology integration is not just a technical solution, but a paradigm transformation in career services that must be innovative, inclusive, adaptive, and sustainable, that can answer the needs of students.

Limitations and Future Research

This review has several limitations. First, the analysis was restricted to studies published between 2015 and 2025 and therefore may not capture earlier foundational developments in technology-enhanced career guidance. Second, the review included only articles indexed in selected databases, potentially excluding relevant studies published in other sources. Third, variations in research designs, educational contexts, and technological interventions limited direct comparison across studies. Future research should employ meta-analytic approaches and investigate the long-term effectiveness of emerging technologies, particularly artificial intelligence-based career guidance systems, across diverse educational settings and cultural contexts.

Conclusion

This systematic literature review demonstrates that technology integration has become an increasingly important strategy for fostering career proactivity in contemporary educational settings. The findings indicate a significant transition from conventional digital tools toward adaptive technologies such as artificial intelligence, augmented reality, virtual counseling systems, and digital career management platforms. These technologies support students' career exploration, planning, decision-making, and self-management, which are essential dimensions of career proactivity. However, successful implementation requires adequate digital competence among counselors, appropriate technological infrastructure, and careful consideration of ethical and privacy issues. Therefore, technology integration should be viewed not merely as a technical innovation but as a transformative approach that enables more personalized, accessible, and future-oriented guidance and counseling services.

Funding Statement

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

Conflict of Interest Statement

The authors declare that there are no financial or non-financial conflicts of interest that could have influenced the objectivity, interpretation, or reporting of the findings presented in this study.

Ethics Declaration

Not applicable. This study is a systematic literature review based exclusively on published literature and did not involve human participants, animals, personal data collection, or any intervention requiring ethical approval

Acknowledgments

The authors would like to express their sincere gratitude to all individuals and academic colleagues who provided valuable support, scholarly insights, and constructive feedback throughout the preparation of this manuscript. Appreciation is also extended to the researchers and scholars whose works contributed significantly to the development of this systematic literature review.

Data Availability

Not applicable.

Reference

- Akkermans, J. (2022). *Career proactivity : Conceptual and theoretical reflections*. October, 1–6. <https://doi.org/10.1111/apps.12444>
- Al-ansi, A. M. (2023). *Integration of ICT in higher education during COVID-19 pandemic : a case study Indah Fatmawati*. 15(4), 430–442.
- Ananto, P., & Ningsih, S. K. (n.d.). *Incorporation of Smartphones and Social Media to Promote Mobile Learning in an Indonesian Vocational Higher Education Setting*. 66–81.
- Anggraini, E., Saprida, S., Choiriyah, C., Rohmatullaili, R., Munir, M., Berkah, A., & Yani, S. (2023). *Jurnal Penelitian Nasional Terakreditasi Universitas Islam Negeri Raden Fatah Palembang Tahun 2020-2023*. 1(2), 75–87.
- Ardi, Z., Putra, M. R. M., & Ifdil, I. (2017). Ethics and legal issues in online counseling services: counseling principles analysis. *Jurnal Psikologi Pendidikan Dan Konseling: Jurnal Kajian Psikologi Pendidikan Dan Bimbingan Konseling*, 3(2), 15
- Asy, M., & Sharov, S. (2024). *Transforming Education with ChatGPT : Advancing Personalized Learning , Accessibility , and Ethical AI Integration*. 3(2), 119–157.
- Atabek, O. (2019). Challenges in integrating technology into education. *arXiv preprint arXiv:1904.06518*.
- Badwy, H. E., Qalati, S. A., & El-bardan, M. F. (2025). Unlocking happiness: how crafting your career path boosts life satisfaction through forward thinking and self-confidence in career choices. *Humanities and Social Sciences Communications*. <https://doi.org/10.1057/s41599-025-04655-9>
- Cybal-michalska, A., & Myszkas-strychalska, L. (2022). *Success and proactivity in the professional career in the perceptions of young people*. 0–3. <https://doi.org/10.34616/www.2022.2.273.298>
- Diana, N., & Ramli, M. (2020). *Bimbingan Karier Dalam Media Portofolio Karier*. 889–895.
- Duan, S., Zhang, H., Liu, L., Lin, Y., Zhao, F., Shi, Q., Lee, C., & Wu, J. (2024). A comprehensive review on triboelectric sensors and AI-integrated systems. *Materials Today*, 80(November), 450–480. <https://doi.org/10.1016/j.mattod.2024.08.013>
- Dysart, S., & Weckerle, C. (2015). *Professional Development in Higher Education : A Model for Meaningful Technology Integration*. 14, 255–265.
- Frandsen, T.F. and Nicolaisen, J. (2024), Defining the early career researcher: A study of publication-based definitions. *Learned Publishing*, 37: e1621. <https://doi.org/10.1002/leap.1621>
- Godsk, M., & Nielsen, B. L. (2024). *Online Teacher Professional Development (oTPD) for Digital Competencies in Higher Education : A Systematic Review of the Literature*. 2, 16–57.
- Gouëdard, P., & Pont, B. (2020). *Education responses to COVID-19: shaping an implementation strategy*. June.
- Hooley, T. (2012). *Articles How the internet changed career : framing the relationship between career development and online technologies*. 29, 3–12.
- Jackson, D., & Tomlinson, M. (2021). *Investigating the relationship between career planning , proactivity and employability perceptions among higher education students in uncertain labour market conditions* (Nomor 2020).
- Jang, H. (2015). *Identifying 21st century STEM competencies using workplace data*. 1–33.
- Jiang, X. (2023). *How do proactive career behaviors translate into subjective career success and perceived employability ? The role of thriving at work and humble leadership*. <https://doi.org/10.1017/jmo.2023.67>
- Kinanti, W., Aini, N., Huda, H. M., & Dahlan, U. A. (2022). *Kebijakan Penghapusan Badan Standar Nasional Pendidikan (BSNP)*. 4, 246–255.
- Mishra, P., & Koehler, M. J. (2006). *Technological Pedagogical Content Knowledge: A Framework*

- for Teacher Knowledge. *Teachers College Record*, 108(6), 1017–1054.
- Mamat, N., Kamarudin, K., Ali, S. R., Mamat, N., Kamarudin, K., & Ali, S. R. (2020). *The Integration of Information and Communication Technology (ICT) in Teaching and Learning in Government and Private Preschools in Malaysia The Integration of Information and Communication Technology (ICT) in Teaching and Learning in Government and Private Preschools in Malaysia*. 1(11), 104–112. <https://doi.org/10.6007/IJARBSS/v10-i11/7881>
- Muthi, T., Ulfadillah, A., & Kalsum, U. (2025). *The Influence Of The Implementation Of Contextual Learning Models On Learning Outcomes In Social Studies Subjects Of Grade IX Students Of SMPN 13 Bengkulu City*. 2(2), 83–90.
- Page, M. J., McKenzie, J. E., Bossuyt, P. M., Boutron, I., Tammy, C., Brennan, S. E., Chou, R., Glanville, J., Grimshaw, J. M., Health, Y., & Consortium, E. (2021). *The PRISMA 2020 statement : an updated guideline for reporting systematic reviews The PRISMA 2020 statement*. 2009, 1–11.
- Parker, S. K. (2010). *Making Things Happen: A Model of Proactive Motivation Sharon K. Parker*. 1–30.
- Patiño, A., Ramírez-Montoya, M. S., & Ibarra-Vazquez, G. (2023). Trends and Research Outcomes of Technology-based Interventions for Complex Thinking Development in Higher Education: A Review of Scientific Publications. *Contemporary Educational Technology*, 15(4)..
- Pembelajaran, M. (2021). *PERANCANGAN BOARD GAME SEBAGAI MEDIA PEMBELAJARAN BAHASA*. 2(3), 44–59.
- Peng, K., Song, X., Hong, J., & Wang, B. (2024). *The application of Augmented Reality (AR) in Remote Work and Education*. 1(1), 33–39.
- Probowati, D., & Malang, U. N. (2023). *Buletin Konseling Inovatif Pengembangan E-Modul Berbasis Case Method pada Mata Kuliah Praktikum Konseling Psikodinamik Pengembangan E-Modul Berbasis Case Method pada Mata (Case Method Based E-Module Development in Psychodynamic Counseling*. 3(1). <https://doi.org/10.17977/um059v3i12023p71-80>
- Putriani, I. (2023). *Analysis Of Technological Pedagogical Content Knowledge (TPACK) of Elementary School Teacher Education Students In Developing Merdeka Curriculum Lesson Plans*. 8(1), 171–179.
- Renyaan, Y., Patrissia, R. U., Dewi, R. A., Makassar, N., Program, P., Program, P., Sahid, U., Education, M., Education, N. S., & Indonesia, U. P. (2025). *A SYSTEMATIC REVIEW OF ARTIFICIAL INTELLIGENCE APPLICATIONS IN HIGHER EDUCATION* : 1–9.
- Savana, L., Fitriani, P., Tresnawati, N., & Khodari, R. (2024). *STEM Approach to 4C Skills in Elementary School Students : A Systematic Literature Review*. 13(1), 10–27.
- Science, J. R. C., & Policy, F. O. R. (2017). *European Framework for the Digital Competence of Educators*.
- Sharapova, N. (2023). *Efficacy of school-based career guidance interventions : A review of recent research*. 10(2), 215–222. <https://doi.org/10.20448/jeelr.v10i2.4554>
- Strauss, K., Griffin, M. A., Parker, S. K., Strauss, K., Griffin, M. A., & Parker, S. K. (2011). *Journal of Applied Psychology Future Work Selves : How Salient Hoped-For Identities Motivate Proactive Career Behaviors Future Work Selves : How Salient Hoped-For Identities Motivate Proactive Career Behaviors*. <https://doi.org/10.1037/a0026423>
- Trilling, B., & Fadel, C. (2009). *21st Century Skills: Learning for Life in Our Times*. San Francisco, CA: Jossey-Bass.
- Vukadin, M. D., & Marković, N. S. (2019). *Developing 21st Century Skills Through Theme - Based Instruction and by Applying Multiple Intelligence Theory : Teacher*. 235–251.
- Wang, D. (2024). *Effect of proactive personality on career adaptability of higher vocational college students : the mediating role of college experience*. May, 1–10.

<https://doi.org/10.3389/fpsyg.2024.1333677>

Wang, S., Wang, F., Zhu, Z., Wang, J., Tran, T., & Du, Z. (2024). Artificial intelligence in education : A systematic literature review. *Expert Systems With Applications*, 252(PA), 124167.

<https://doi.org/10.1016/j.eswa.2024.124167>

Wu, Z. J. C. (2022). *Moving forward : Diverse conceptual and theoretical perspectives to advance career proactivity research*. October, 1–6. <https://doi.org/10.1111/apps.12446>

Yu, C., Zhang, Z., Lin, C., & Wu, Y. J. (n.d.). *Knowledge Creation Process and Sustainable Competitive Advantage : the Role of Technological Innovation Capabilities*.

<https://doi.org/10.3390/su9122280>

Zen, E. F., Zen, E. F., Hotifah, Y., Prihatiningsih, R., & Aris, N. M. (2025). *Buletin Konseling Inovatif Validation of Micro Digital Content Model of Project-Based Learning for Guidance and Counseling Courses in Non-Formal Education Validation of Micro Digital Content Model of Project-Based Learning for Guidance and Counseling Courses in Non-Formal Education*. 5(2).

<https://doi.org/10.17977/um059v5i22025p158-164>

Zhao, X. (2025). *Perceived Transformational Leadership and Career Success Among Chinese University Teachers : The Mediating Role of Career Adaptability*. 24(4), 391–408.