Digital Career Guidance Tools and Career Adaptability Among Undergraduate Students: A Review of Empirical Evidence

Mutong Cecilia Maren, Azor Loveth C., Ronke Olayemi Akintola and Doka II Obadiah Abimiku
Department of Guidance and Counselling
Faculty of Education
University of Abuja
Email: Cecilia.mutong@uniabuja.edu.ng
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Abstract
The increasing complexity of the transition from higher education to employment has heightened the need for effective approaches to developing career adaptability among undergraduate students. Digital career guidance tools, including online career counselling platforms, digital career assessment resources, career-planning applications, and artificial intelligence (AI)-supported systems, provide emerging opportunities for expanding access to career development services. This article reviews empirical evidence on the relationship between digital career guidance tools and career adaptability among undergraduate students, with particular attention to the Nigerian context. Empirical studies published between 2016 and 2026 were examined, focusing on online career interventions, digital competence, AI-supported career guidance, career counselling, and career adaptability. The reviewed evidence indicates that structured digital career interventions can improve career adaptability and related outcomes, including career decision-making self-efficacy, career planning, confidence, and employability. However, the evidence is uneven, with much of the direct intervention research originating outside Nigeria. Nigerian studies demonstrate the importance of career adaptability, career guidance, and digital career development, while recent evidence suggests favourable perceptions of AI-supported career guidance among Nigerian university students. Nevertheless, direct evidence of the effectiveness of digital career guidance tools in improving career adaptability among Nigerian undergraduates remains limited. The review concludes that digital career guidance has considerable potential but should complement professional Guidance and Counselling services rather than replace counsellor involvement. Nigerian universities should adopt accessible, ethically governed, culturally responsive, and evidence-based digital career guidance systems and strengthen research evaluating their effectiveness.

Keywords: *digital career guidance, career adaptability, undergraduate students, artificial intelligence, online counselling, Guidance and Counselling, Nigeria.*

1.1 Introduction

The transition from higher education to employment has become increasingly complex as young people enter a labour market characterised by technological advancement, changing occupational

requirements, economic uncertainty, and intense competition for employment opportunities. For undergraduate students, this transition involves more than acquiring academic qualifications; it requires the ability to understand personal strengths and interests, explore occupational possibilities, make informed career decisions, develop relevant competencies, and adjust to changing work conditions. These demands have made career adaptability an important resource for students preparing to enter the world of work. In this context, career guidance is expected to assist students in developing the knowledge, skills, confidence, and flexibility required to navigate educational and occupational transitions successfully. The importance of career adaptability is particularly evident in the Nigerian context, where young people face considerable challenges in transitioning successfully from education to employment. Ezema and Autin (2024), in a study of 310 Nigerian undergraduates, found that career adaptability and work volition significantly predicted students' perceptions of their future access to decent work. They further reported that students who perceived greater prospects of securing decent work also reported higher levels of academic satisfaction, life satisfaction, and career engagement. These findings suggest that career adaptability is an important resource for Nigerian undergraduates as they prepare for employment and future career development. Earlier Nigerian evidence similarly demonstrates the importance of effective career preparation among university students. Pitan and Atiku (2017), in a study of 600 final-year undergraduates from four Nigerian universities, found that career guidance activities significantly influenced students' employability. Self-awareness and opportunity awareness had the strongest influence, followed by decision-making and transition-learning skills. The findings indicate that effective career guidance should help students understand themselves, identify available opportunities, make appropriate career decisions, and prepare for the transition from university to employment. The need for effective career guidance is further reinforced by evidence concerning career services in Nigerian higher education. Okolie et al. (2020) examined careers advice, guidance, and counselling within Nigerian higher education and highlighted the need for career guidance systems capable of adequately supporting students' career development, aspirations, and choices. Their findings underscore the importance of strengthening career guidance provision within higher education institutions rather than assuming that students will independently acquire the information and competencies required for successful career transitions. Similarly, Nigerian research has established that career adaptability is influenced by both personal and contextual resources. Ebenehi et al. (2016), in a study of 603 higher education students in Nigeria, found that career self-efficacy sources, personal goal orientation, career future concern, and perceived social support significantly predicted career adaptability. These findings indicate that students' capacity to respond effectively to career demands can be supported through appropriate developmental experiences and resources. Although the study predates the current expansion of digital career technologies, it provides an important basis for examining whether contemporary digital interventions can create additional opportunities for developing career adaptability among Nigerian students. Against this background, traditional career guidance is increasingly being complemented by digital technologies. Digital career guidance tools include online career counselling platforms, digital career assessments, web-based career information systems, electronic career portfolios, virtual career education programmes, online mentoring, career-planning applications, and artificial intelligence (AI)-supported career guidance systems. These technologies have the potential to make career information and support more accessible, personalised, flexible, and responsive to students' changing needs. Rather than depending exclusively on scheduled face-to-face counselling sessions, students can use digital platforms for

continuous career exploration, self-assessment, information seeking, career planning, and engagement with career resources. The relevance of digital career guidance has become particularly evident with the emergence of artificial intelligence. AI-supported systems can process information about users' interests, competencies, educational backgrounds, career preferences, and aspirations and use such information to generate personalised career recommendations. This capacity may help students explore alternative career pathways, identify competency gaps, obtain occupational information, and make more informed career decisions. However, the usefulness of such technologies depends on factors such as accessibility, reliability, cultural relevance, usability, and appropriate integration with professional career counselling. Recent Nigerian evidence provides direct support for examining this emerging approach. Eze, Alabi, and Osunbunmi (2025) investigated perceptions of AI-driven personalised career guidance among 341 Nigerian undergraduate and postgraduate students. They found that both groups were generally comfortable with and trusting of AI platforms for career recommendations. However, participants also reported low satisfaction with existing career guidance services and difficulties accessing information about academic programmes during the application process. The authors therefore recommended accessible, user-friendly, and adaptable AI-driven career guidance platforms suited to the Nigerian context. The findings of Eze et al. (2025) are particularly relevant because they indicate that Nigerian students may be receptive to technology-supported career guidance. However, their study focused primarily on perceptions and acceptance of AI-driven guidance rather than directly determining whether such tools improve career adaptability. This distinction is important because willingness to use a digital career guidance platform does not, by itself, establish that the platform produces meaningful developmental outcomes. Career adaptability provides an appropriate outcome for examining the effectiveness of digital career guidance because it captures the psychosocial resources required to manage career-related tasks, transitions, and changes. It encompasses career concern, career control, career curiosity, and career confidence. A well-designed digital career guidance intervention could potentially strengthen these dimensions by helping students think about their career futures, assume responsibility for career decisions, explore occupational possibilities, and develop confidence in managing career-related challenges. Digital career guidance may therefore provide an important mechanism through which universities can support students' transition from education to employment. There is also evidence that career adaptability has implications beyond immediate career decision-making. Ezema and Autin (2024) found that career adaptability was associated with Nigerian undergraduates' perceptions of future access to decent work, while perceptions of future employment prospects were related to academic satisfaction, life satisfaction, and career engagement. These findings suggest that career adaptability may influence how students perceive and engage with their anticipated working lives. Despite these developments, empirical evidence directly connecting digital career guidance tools with career adaptability among undergraduate students remains fragmented. Existing studies have examined online career interventions, digital competence, AI-supported career guidance, employability, career counselling, and career decision-making, but these strands of evidence have not been sufficiently integrated. While Nigerian studies have established the importance of career guidance and career adaptability, and recent Nigerian research has examined students' perceptions of AI-driven career guidance, limited evidence directly establishes whether digital career guidance tools improve career adaptability among Nigerian undergraduates. A recent systematic review of undergraduate career adaptability also identified a shortage of longitudinal evidence concerning the development of career adaptability among university students (Low et al., 2026).

This gap has important implications for guidance and counselling practice in Nigerian universities. If digital career guidance tools can effectively strengthen students' career adaptability, their integration into university counselling services could provide more continuous opportunities for self-exploration, career information seeking, occupational exploration, decision-making, and career planning. However, such integration should be evidence-based and should complement rather than replace professional counselling. Existing Nigerian evidence already demonstrates the importance of self-awareness, opportunity awareness, decision-making, and transition-learning skills in students' employability (Pitan & Atiku, 2017). Therefore, this article reviews the empirical evidence on digital career guidance tools and career adaptability among undergraduate students, with particular attention to evidence relevant to the Nigerian higher education context. The review examines the forms of digital career guidance investigated in existing studies, the career-related outcomes associated with their use, the extent to which available evidence supports their influence on career adaptability, and the methodological and contextual gaps requiring further investigation. The review also considers the implications of the emerging evidence for guidance and counselling practice in Nigerian universities.

1.2 Statement of the Problem

The transition from university education to the world of work is increasingly challenging because of rapid technological change, evolving occupational requirements, limited employment opportunities, and intense competition. Beyond academic qualifications, undergraduates require the ability to anticipate career changes, explore alternatives, make informed decisions, and manage career transitions effectively. These capacities are reflected in career adaptability, which is important for navigating an uncertain and changing labour market.

In Nigeria, concerns remain regarding the adequacy of career guidance available to university students. Evidence indicates that career guidance activities can enhance self-awareness, opportunity awareness, decision-making, and employability (Pitan & Atiku, 2017), while Nigerian higher education institutions require stronger career advice, guidance, and counselling systems to support students' career development (Okolie et al., 2020). Limited access to relevant career information and professional guidance may therefore constrain students' preparation for career transitions. The rapid development of digital technologies and artificial intelligence has created new possibilities for career guidance through online career information, digital assessments, occupational exploration, personalised recommendations, virtual counselling, and career-planning platforms. However, the availability and acceptance of these tools do not necessarily demonstrate improvements in students' career adaptability. Recent Nigerian evidence, for example, indicates positive perceptions of AI-driven career guidance but also dissatisfaction with existing services and difficulties accessing career-related information (Eze et al., 2025). Importantly, this evidence focuses largely on perceptions and acceptance rather than directly establishing effects on career adaptability. Thus, an important empirical gap remains. Although studies have examined career guidance, digital competence, AI-supported guidance, employability, and career decision-making, limited evidence directly establishes the relationship between digital career guidance tools and career adaptability among Nigerian undergraduates. This gap is particularly important as universities increasingly explore digital technologies as part of their educational and career-support services. Consequently, this review examines available empirical evidence on digital career guidance tools and career adaptability among undergraduate students, with particular attention to the Nigerian context. It seeks to identify established findings, areas of inconsistency,

methodological limitations, and contextual gaps, while highlighting implications for guidance and counselling practice and future research.

1.3 Purpose of the Study

The purpose of this review is to examine the empirical evidence on digital career guidance tools and career adaptability among undergraduate students. Specifically, the review examines the types of digital career guidance tools used to support students' career development, synthesises evidence on their influence on career adaptability, and considers their contribution to the dimensions of career concern, career control, career curiosity, and career confidence. The review also identifies methodological and contextual gaps in the existing literature and discusses the implications of the evidence for guidance and counselling practice and future research, particularly within Nigerian universities.

2.1 Conceptual Framework

The conceptual framework for this review is based on the proposition that digital career guidance tools can provide undergraduate students with accessible, personalised, interactive, and continuous career-development support, thereby strengthening their capacity to manage career-related tasks, transitions, and changes. The framework conceptualises digital career guidance tools as the independent construct and career adaptability as the outcome construct.

Digital career guidance tools encompass online career counselling, digital career assessments, online career information systems, artificial intelligence-supported career guidance, virtual career education, digital career-planning platforms, electronic career portfolios, and online mentoring. These tools can provide opportunities for self-assessment, occupational exploration, career information seeking, goal setting, decision-making, skills development, and career planning. Through these functions, digital career guidance may provide developmental experiences that strengthen students' capacity to respond effectively to changing career demands.

Career adaptability constitutes the outcome construct and is conceptualised through four interrelated dimensions: career concern, career control, career curiosity, and career confidence. Career concern reflects students' orientation towards and preparation for their career future; career control represents their sense of responsibility for career decisions and actions; career curiosity involves exploring possible occupational roles and career alternatives; and career confidence reflects their belief in their ability to overcome career-related challenges and accomplish career tasks. The framework therefore proposes that effective exposure to digital career guidance tools may enhance career adaptability by helping students prepare for their career futures, assume greater responsibility for career decisions, explore occupational possibilities, and develop confidence in managing career-related challenges. The strength of this relationship may, however, be influenced by individual and contextual factors such as digital competence, access to technology, quality and relevance of career information, students' engagement with the tools, and availability of professional counsellor support.

2.1.1 Conceptual Representation

Digital Career Guidance Tools

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Online career counselling

Digital career assessment

Online career information
AI-supported career guidance
Virtual career education
Digital career planning
Electronic career portfolios
Online mentoring
↓
Career Development Processes
Self-awareness → Career exploration → Career information seeking → Goal setting → Career decision-making → Career planning
↓
Career Adaptability
Career Concern
Career Control
Career Curiosity
Career Confidence

The framework suggests that digital career guidance tools do not influence career adaptability merely through the presence of technology. Rather, their potential influence occurs through the career-development processes they facilitate. This provides a logical basis for examining empirical evidence concerning whether and how digital career guidance contributes to undergraduate students' preparedness to manage career transitions and changing occupational demands.

2.2 Conceptual Analysis

This section examines the key concepts underpinning the study, with emphasis on digital career guidance, digital career guidance tools, online career counselling, artificial intelligence-supported career guidance, career development, career adaptability, and related career-development constructs. The analysis also considers digital competence, employability, career planning, career decision-making, and Guidance and Counselling to clarify their relevance to the relationship between digital career guidance and undergraduate students' career adaptability.

2.2.1 Digital Career Guidance Tools

Digital career guidance tools refer to technology-enabled resources and platforms designed to support individuals in understanding themselves, exploring educational and occupational opportunities, making career decisions, and planning their future careers. In higher education, these tools have expanded career guidance beyond conventional face-to-face counselling to include online career counselling, digital career assessments, web-based career information systems, artificial intelligence-supported guidance, virtual career education, digital career-planning platforms, electronic portfolios, and online mentoring. Their major advantage is their potential to provide flexible and continuous access to career-related information and support.

For undergraduate students, digital career guidance tools can facilitate self-assessment by providing opportunities to examine interests, abilities, values, personality characteristics, and career preferences. They can also provide occupational information, identify possible career pathways, support goal setting, and facilitate career decision-making. AI-based systems may further personalise these processes by analysing students' responses and generating

recommendations based on individual characteristics and preferences. However, the effectiveness of such tools depends on the quality of the information provided, digital competence, accessibility, usability, and the extent to which technology-supported guidance is integrated with professional counselling.

The Nigerian context makes the development of effective digital career guidance particularly relevant. Nigerian undergraduates require timely and reliable information to navigate increasingly complex educational and occupational choices. Evidence that Nigerian students are receptive to AI-supported personalised career guidance suggests that digital platforms may provide an additional channel for strengthening university career services (Eze et al., 2025). However, digital tools should complement rather than replace professional counsellors, particularly when students require personalised interpretation, emotional support, ethical guidance, or assistance with complex career decisions.

2.2.2 Career Adaptability

Career adaptability refers to the psychosocial resource's individuals employ to cope with current and anticipated career tasks, transitions, and changes. It is particularly relevant to undergraduate students because university represents a period of career exploration, decision-making, preparation for employment, and transition from education to work. Students with stronger career adaptability are better positioned to consider their career futures, take responsibility for career decisions, explore alternative possibilities, and approach career challenges with confidence.

Career adaptability is commonly represented by four dimensions: concern, control, curiosity, and confidence. These dimensions are interconnected but represent distinct aspects of adaptive career behaviour. Career concern involves thinking about and preparing for the future; career control involves taking responsibility for career decisions and actions; career curiosity involves exploring possible selves, occupations, and career alternatives; while career confidence refers to belief in one's ability to overcome obstacles and successfully perform career-related tasks.

Nigerian evidence demonstrates the relevance of career adaptability to students' future career experiences. Ezema and Autin (2024) found that career adaptability was associated with Nigerian undergraduates' perceptions of future access to decent work. Similarly, Ebenehi et al. (2016) identified several personal and contextual factors associated with career adaptability among Nigerian higher education students. Together, these findings reinforce the importance of providing students with developmental experiences that strengthen their capacity to manage career transitions.

2.2.3 Digital Career Guidance Tools and Career Concern

Career concern reflects an individual's orientation towards the future and readiness to prepare for anticipated career tasks. Digital career guidance tools may promote career concern by exposing students to information about occupations, emerging employment trends, required competencies, and alternative career pathways. Online career-planning programmes can also encourage students to establish career goals and develop action plans. For undergraduate students, regular engagement with digital career information may transform career preparation from an activity undertaken primarily near graduation into a continuous developmental process. Digital platforms can provide career-planning exercises, occupational information, reminders, and opportunities for reflection, thereby encouraging students to think more deliberately about their career futures.

2.2.4 Digital Career Guidance Tools and Career Control

Career control concerns the extent to which individuals take responsibility for their career decisions and actions. Digital career guidance tools may enhance career control by providing students with opportunities to assess their interests and competencies, compare career alternatives, establish goals, monitor progress, and make informed decisions.

Online career-planning platforms can allow students to document their goals and monitor their progress over time. Similarly, digital assessments can provide information that assists students in evaluating the relationship between their characteristics and potential career choices. However, digital recommendations should not be treated as predetermined career prescriptions. Professional guidance remains important for helping students interpret information and make decisions that are consistent with their values, abilities, circumstances, and aspirations.

2.2.5 Digital Career Guidance Tools and Career Curiosity

Career curiosity involves exploring possible career selves and occupational environments. It is particularly important for undergraduates because many students enter university without a fully established occupational identity. Digital technologies can broaden opportunities for exploration by providing access to occupational databases, career videos, virtual workplace experiences, professional networks, online mentoring, virtual career fairs, and information about emerging occupations. Through these resources, students can investigate occupations that may not be readily visible within their immediate social or geographical environments. Digital career guidance can therefore expand the range of career alternatives considered by students and encourage more informed occupational exploration.

2.2.6 Digital Career Guidance Tools and Career Confidence

Career confidence refers to students' belief in their ability to manage career-related tasks and overcome obstacles. Digital career guidance tools may strengthen confidence by providing opportunities for skills development, practice, feedback, and progressive mastery of career-related activities. For example, virtual interview simulations can enable students to practise responding to interview questions, while digital career-planning activities can help students develop strategies for addressing career problems. Personalised feedback from digital platforms may also help students identify strengths and areas requiring further development. Nevertheless, confidence is unlikely to develop simply through exposure to technology; meaningful engagement, appropriate feedback, successful experiences, and professional support remain important components of effective career development.

2.2.7 Relationship between Digital Career Guidance Tools and Career Adaptability

The conceptual relationship between digital career guidance tools and career adaptability is based on the proposition that technology can provide developmental experiences through which students acquire information, explore alternatives, establish goals, make decisions, and develop confidence. Digital career guidance may consequently contribute to the four dimensions of career adaptability by supporting future orientation, personal responsibility, occupational exploration, and perceived capability. However, this relationship should not be regarded as automatic or universally positive. Digital competence, access to technology, quality of digital information, engagement with the platform, cultural relevance of the guidance, and availability of professional counsellor support may influence outcomes. In the Nigerian context, these factors are particularly important because

differences in digital access and the quality of career services may affect students' ability to benefit from technology-supported guidance.

2.3 Theoretical Framework

The review is anchored in Career Construction Theory (CCT) and Social Cognitive Career Theory (SCCT), which provide complementary perspectives for understanding the career-development processes underlying career adaptability among undergraduate students. CCT provides the primary framework for explaining how students develop career concern, control, curiosity, and confidence in responding to changing career demands, while SCCT explains how self-efficacy, outcome expectations, personal goals, and learning experiences shape career-related behaviour. Together, the theories provide a basis for understanding how digital career guidance tools may support students' career exploration, decision-making, confidence, and adaptation to career transitions.

2.3.1 Career Construction Theory by Savickas (2005, 2013)

Career Construction Theory, developed by Savickas (2005, 2013), explains career development as an active process through which individuals construct meaning from their experiences and adapt to changing career environments. The theory views individuals as active agents in constructing their career paths rather than simply matching their characteristics to predetermined occupations. A central concept of the theory is career adaptability, which refers to the psychosocial resource's individuals use to manage current and anticipated career tasks, transitions, and changes.

Career adaptability comprises four dimensions: career concern, career control, career curiosity, and career confidence. Concern involves preparing for the career future; control reflects taking responsibility for career decisions; curiosity involves exploring possible career roles and occupational environments; and confidence refers to the belief that one can successfully overcome career-related challenges. These dimensions are particularly relevant to undergraduate students who are exploring career possibilities and preparing for the transition from university to employment. The theory is relevant to this review because digital career guidance tools can provide students with opportunities to construct and manage their careers. Online career assessments can promote self-understanding, digital career information can facilitate occupational exploration, career-planning platforms can support future planning, and virtual career activities can provide opportunities for developing confidence. Career Construction Theory therefore provides a useful explanation of how digital career guidance may contribute to students' career adaptability.

2.3.2 Social Cognitive Career Theory by Lent, Brown, and Hackett (1994)

Social Cognitive Career Theory, developed by Lent, Brown, and Hackett (1994), explains career development in terms of the interaction among self-efficacy beliefs, outcome expectations, personal goals, learning experiences, and contextual factors. The theory proposes that individuals' career interests, choices, and actions are influenced partly by what they believe they are capable of doing and what they expect to achieve from their actions.

The theory is relevant to digital career guidance because digital platforms can provide students with learning experiences that influence career self-efficacy and outcome expectations. Digital career assessments can help students identify their strengths and interests, online occupational information can increase knowledge of career opportunities, virtual simulations can provide opportunities for practice, and personalised digital feedback can strengthen confidence in career-

related tasks. These experiences may subsequently influence students' career goals, choices, and willingness to explore alternative career pathways.

Social Cognitive Career Theory also draws attention to contextual factors that may facilitate or constrain students' use of digital career guidance. Access to digital devices, internet connectivity, digital competence, institutional support, quality of career information, and availability of professional counsellors may influence the extent to which students benefit from digital career guidance. This makes the theory particularly relevant to understanding digital career guidance within the Nigerian university context.

2.3.3 Relevance of the Theories to the Review

Career Construction Theory and Social Cognitive Career Theory provide complementary explanations for the relationship between digital career guidance tools and career adaptability. Career Construction Theory explains the career resources students need to develop, particularly concern, control, curiosity, and confidence, while Social Cognitive Career Theory helps explain how digital career-development experiences may strengthen these resources through learning experiences, self-efficacy, outcome expectations, and goal setting.

Together, the theories provide a framework for understanding how digital career guidance can move beyond the simple provision of career information towards active career exploration, informed decision-making, purposeful planning, and confidence-building. They therefore provide an appropriate theoretical foundation for reviewing empirical evidence on the capacity of digital career guidance tools to enhance undergraduate students' career adaptability, particularly within Nigerian universities.

3.1 Empirical Review of Digital Career Guidance and Career Adaptability

This section reviews empirical evidence on digital career guidance and career adaptability, focusing on online career guidance and counselling, digital career-planning programmes, artificial intelligence-supported career guidance, digital competence, and career adaptability among university and higher education students. Particular attention is given to evidence from Nigeria to assess the relevance and applicability of emerging digital career guidance approaches within the Nigerian higher education context.

3.1.1 Online Career Adaptability Programmes

One of the strongest forms of evidence comes from intervention studies examining whether structured online programmes can directly improve career adaptability.

Kim (2022) developed and evaluated a 13-week online career adaptability programme for undergraduate students. The programme addressed self- and work-environment knowledge, self-directed career behaviour, and interaction with the environment in career decision-making and adaptation. The effectiveness study involved an experimental group of 54 students, a comparison group of 56, and a control group of 53. The findings showed statistically significant differences in career adaptability across the groups, with the experimental group recording the highest level of career adaptability. This study provides important evidence because the intervention was not simply an online information resource. Rather, it systematically connected digital career-development activities with career-adaptability outcomes. The findings suggest that digital career guidance may be more effective when it is structured around clearly defined developmental objectives and opportunities for active student engagement.

Veres (2021) also investigated an online career intervention among university students, with 65 students participating in the intervention and 67 serving as a control group. The intervention was designed to develop career adaptability through digital technology. Although the study provides additional support for the potential of online interventions, its bibliographic details require careful verification before it is used as a major source in the final reference list.

Earlier evidence provides further support for the usefulness of online career planning. Teychenne et al. (2019) evaluated an online career-planning module involving 80 university students and found significant improvements in career-planning strategies, career concern, decision-making, confidence, and problem-solving. In addition, 80% of participants identified jobs that they had not previously considered. Although the study predates the main recent evidence period, it provides useful foundational evidence that digitally delivered career-development activities can influence outcomes closely related to career adaptability.

3.1.2 Online Career Counselling

Online career counselling represents another important digital pathway. Yiğit et al. (2026) conducted a meta-analysis of 14 studies involving 1,721 participants to examine the effectiveness of online career counselling interventions on career-related psychological outcomes. The studies, published between 2016 and 2025, included experimental, quasi-experimental, and pre-experimental designs. The meta-analysis provided overall support for positive effects of online career counselling interventions on career-related psychological outcomes. However, the outcomes examined were not limited exclusively to career adaptability. This distinction is important because evidence that online counselling improves career decision-making, self-efficacy, career planning, or related outcomes should not automatically be interpreted as evidence that every digital tool improves career adaptability. Nevertheless, these outcomes are closely related to the resources required for successful career transitions. Digital counselling may therefore be particularly useful when it provides opportunities for reflection, personalised feedback, career exploration, goal setting, and action planning rather than merely delivering occupational information.

3.1.3 Digital Competence and Career Adaptability

Digital career guidance is closely related to students' own digital competence. Zhou et al. (2023) examined 298 higher education students in China and found a positive relationship between digital competence and career adaptability. Their analysis further indicated that digital informal learning and academic performance played mediating roles in this relationship.

This finding is relevant because students' ability to benefit from digital career guidance may depend partly on their capacity to navigate digital environments effectively. Students with limited digital competence may encounter difficulties evaluating online career information, using assessment platforms, accessing virtual mentoring, creating digital portfolios, or critically interpreting AI-generated recommendations. Thus, digital career guidance should not be considered independently of students' digital capabilities. Universities introducing technology-supported career services should also strengthen students' capacity to use digital information critically and responsibly.

3.1.4 Artificial Intelligence-Based Career Guidance

Artificial intelligence represents an emerging generation of digital career guidance. AI systems can potentially personalise career recommendations by analysing information concerning students' interests, skills, educational backgrounds, career preferences, and available occupational opportunities. Zhang and Zhou (2025) conducted an experimental study involving 70 university students, with 35 students assigned to an AI-based career guidance intervention and 35 to a control group. The eight-week intervention provided personalised career assessments, targeted feedback, and mock-interview simulations. The experimental group demonstrated significant improvements in career-decision self-efficacy, career adaptability, and employability compared with the control group. Participants also reported positive perceptions concerning personalisation, accessibility, and skill development, although some expressed a preference for human interaction.

This study provides particularly relevant evidence because career adaptability was measured directly as an outcome of an AI-based intervention. It suggests that AI-supported guidance can extend beyond simple information retrieval to provide personalised developmental experiences.

However, AI-based career guidance requires careful implementation. Career decisions involve personal values, contextual constraints, socioeconomic circumstances, family expectations, and individual aspirations that may not be adequately captured by algorithms. Consequently, AI-supported guidance should complement professional counselling rather than replace the counsellor's role.

3.1.5 Evidence from Nigeria

The Nigerian evidence base remains smaller than the emerging international literature, but recent studies demonstrate the growing relevance of digital career guidance and career adaptability.

Eze et al. (2025) examined perceptions of AI-driven personalised career guidance among 341 Nigerian undergraduate and postgraduate students. The findings indicated that students were generally comfortable with and trusting of AI platforms for career recommendations. However, participants also reported dissatisfaction with existing career guidance and difficulties obtaining information about academic programmes during the application process. The authors therefore recommended accessible, user-friendly, and adaptable AI-driven career guidance platforms for the Nigerian context. Although the study examined perceptions and acceptance rather than directly measuring career adaptability, it provides important contextual evidence. Nigerian students appear receptive to technology-supported career guidance, creating a potentially favourable environment for further intervention research. However, acceptance should not be equated with demonstrated effectiveness. Nigerian evidence also demonstrates the broader importance of career adaptability. Ezema and Autin (2024), in a study of 310 Nigerian undergraduates, found that career adaptability and work volition predicted perceptions of future access to decent work. They further reported that perceptions of future decent work were associated with students' academic satisfaction, life satisfaction, and career engagement. Similarly, Ebenehi et al. (2016) found that career self-efficacy sources, personal goal orientation, career future concern, and perceived social support significantly predicted career adaptability among 603 higher education students in Nigeria. The findings underscore the importance of providing students with appropriate career-development resources and interventions. Pitan and Atiku (2017) likewise demonstrated that career guidance activities positively influenced students' employability, particularly through self-awareness, opportunity awareness, decision-making, and transition-learning skills. Taken together, these studies provide a strong rationale for investigating digital career guidance within Nigerian universities. However,

the existing evidence does not yet establish conclusively whether digital career guidance directly produces sustained improvements in career adaptability among Nigerian undergraduates.

3.2 Discussion of Empirical Evidence

The empirical evidence reviewed indicates that digital career guidance has considerable potential to support undergraduate students' career development and adaptability. However, the strength of the evidence varies according to the type of digital intervention, outcome measured, research design, and context in which the intervention was implemented. Overall, the evidence suggests that structured digital career interventions are more likely to produce meaningful outcomes when they involve active engagement, personalised feedback, career exploration, and opportunities for practice rather than merely providing access to career information.

Evidence from online career adaptability programmes provides the clearest support for a relationship between digital intervention and career adaptability. Kim (2022) reported significant improvements in career adaptability following a structured 13-week online programme for undergraduate students. Similarly, Teychenne et al. (2019) found improvements in career planning, career concern, decision-making, confidence, and problem-solving following an online career-planning intervention. These findings indicate that digital career interventions can support several processes underlying career adaptability, particularly when students are actively involved in structured career-development activities. The evidence from AI-supported career guidance further strengthens this conclusion. Zhang and Zhou (2025) found that an eight-week AI-based career guidance intervention significantly improved career-decision self-efficacy, career adaptability, and employability among university students. The importance of this finding lies in the direct measurement of career adaptability rather than relying solely on students' perceptions of the usefulness or acceptability of technology. It suggests that AI-supported systems can potentially contribute to career adaptability when they provide personalised assessments, targeted feedback, and opportunities for skills development. Nevertheless, the evidence should not be interpreted as demonstrating that all forms of digital career guidance automatically enhance career adaptability. The 2026 meta-analysis by Yiğit et al. provides broader evidence that online career counselling can improve career-related psychological outcomes, but the studies included different outcomes and intervention approaches. Consequently, positive effects on career decision-making, self-efficacy, career planning, or related variables cannot automatically be equated with improvements in career adaptability. This distinction is important because career adaptability is a multidimensional construct involving concern, control, curiosity, and confidence.

The reviewed evidence also indicates that digital competence may influence students' ability to benefit from technology-supported career guidance. Zhou et al. (2023) found a positive relationship between digital competence and career adaptability among higher education students. This suggests that access to digital career guidance alone may be insufficient. Students must also possess the skills required to search for, evaluate, interpret, and apply digital career information effectively. In this regard, digital career guidance should be accompanied by digital literacy and information-evaluation skills, particularly as students increasingly encounter AI-generated career information. The Nigerian evidence presents a related but less developed picture. Eze et al. (2025) found that Nigerian undergraduate and postgraduate students were generally receptive to AI-driven career guidance and expressed confidence in using such platforms for career recommendations. However, the study primarily examined perceptions and acceptance rather than changes in career adaptability. Therefore, the Nigerian evidence currently provides stronger support for the

acceptability and potential relevance of digital career guidance than for its demonstrated effectiveness in improving career adaptability.

This distinction is important when interpreting Nigerian evidence on career adaptability more generally. Ezema and Autin (2024) demonstrated that career adaptability is associated with Nigerian undergraduates' perceptions of future access to decent work and related positive career and life outcomes. Ebenehi et al. (2016) also identified career self-efficacy, goal orientation, future concern, and social support as significant predictors of career adaptability among Nigerian higher education students. These findings establish the importance of career adaptability within the Nigerian context but do not determine whether digital career guidance is an effective mechanism for developing it. Similarly, Pitan and Atiku (2017) found that career guidance activities significantly influenced students' employability, particularly through self-awareness, opportunity awareness, decision-making, and transition-learning skills. These findings are relevant to digital career guidance because many digital tools are designed to facilitate precisely these processes. However, the study examined career guidance activities more broadly and therefore cannot be interpreted as direct evidence of the effectiveness of digital tools.

Taken together, the evidence suggests that the potential contribution of digital career guidance lies less in technology itself than in the developmental experiences it facilitates. Digital platforms can increase access to career information, provide opportunities for self-assessment and occupational exploration, support goal setting and career planning, and provide feedback that may strengthen students' confidence. These processes correspond closely with the four dimensions of career adaptability: concern, control, curiosity, and confidence. The relationship is therefore better understood as a developmental pathway in which digital tools facilitate experiences that may strengthen adaptability resources. The evidence also highlights the continuing importance of professional counsellors. Although digital technologies can increase accessibility and personalisation, career development involves personal, social, cultural, economic, and psychological considerations that may require professional interpretation. The finding that some students in Zhang and Zhou's (2025) study still preferred human interaction reinforces the importance of maintaining a human component within digitally supported career services. Digital career guidance should therefore be conceptualised as an extension of professional counselling rather than a complete substitute for it.

For Nigerian universities, this distinction has practical significance. Digital career guidance could help address some limitations associated with conventional career services by providing students with more flexible access to career information, assessments, planning resources, and career-development activities. However, successful implementation would require attention to digital accessibility, students' digital competence, reliability of career information, cultural and labour-market relevance, data privacy, and professional oversight. The technology should be designed around students' developmental needs rather than introduced merely as a technological innovation.

Overall, the empirical evidence provides promising but not yet conclusive support for the relationship between digital career guidance tools and career adaptability among undergraduate students. The strongest evidence comes from structured online and AI-supported interventions that directly measure career adaptability, while Nigerian evidence remains concentrated on career guidance, career adaptability, and perceptions of AI rather than direct intervention studies. This indicates a clear need for more rigorous Nigerian research using experimental, quasi-experimental, and longitudinal designs to determine whether digitally delivered career guidance can produce

sustained improvements in career concern, control, curiosity, and confidence among undergraduates.

3.3. Gaps in the Empirical Literature

The empirical evidence reviewed reveals several important gaps concerning digital career guidance tools and career adaptability among undergraduate students.

1. There is a contextual gap. Although studies from different countries have reported positive associations or effects of online career interventions, digital competence, and AI-based career guidance on career-related outcomes (Kim, 2022; Zhang & Zhou, 2025; Zhou et al., 2023), direct empirical evidence from Nigeria remains limited. Existing Nigerian studies have largely examined career adaptability, employability, career decision-making, and career guidance activities without specifically evaluating digital career guidance interventions (Ebenehi et al., 2016; Pitan & Atiku, 2017; Ezema & Autin, 2024). This limits the extent to which findings from other contexts can be generalised to Nigerian undergraduates.
2. There is an outcome gap. Several studies have focused on related outcomes such as career decision-making, career-decision self-efficacy, employability, career planning, and confidence. While these outcomes are closely connected to career adaptability, they do not fully capture the adaptability construct. Consequently, there is insufficient evidence on how digital career guidance tools influence the four dimensions of career adaptability: concern, control, curiosity, and confidence. This distinction is important because an intervention may improve career decision-making or employability without necessarily strengthening students' broader capacity to manage career transitions.
3. A methodological gap is evident. Much of the available literature relies on cross-sectional, pre-post, or small-scale intervention designs. A recent systematic review similarly identified the predominance of cross-sectional studies and the relative scarcity of longitudinal evidence on undergraduate career adaptability. More rigorous experimental and quasi-experimental studies are therefore needed to establish whether observed improvements in career adaptability are attributable to digital career guidance rather than to other educational or personal factors.
4. There is a technology-specific gap. Digital career guidance encompasses diverse technologies, including online counselling platforms, artificial intelligence systems, career assessment applications, digital career information resources, virtual mentoring, e-portfolios, and online career-planning programmes. However, these tools have not been equally investigated, particularly within Nigerian universities. The rapid development of AI-driven career guidance makes this gap increasingly important because evidence on students' acceptance or perceptions of AI does not, by itself, demonstrate its effectiveness in improving career adaptability. For example, Nigerian undergraduates have reported favourable perceptions of AI-supported career guidance, but the evidence remains primarily concerned with perceptions and confidence in career decision-making rather than demonstrated changes in career adaptability.
5. An access and equity gap remain insufficiently addressed. Digital career guidance assumes access to appropriate devices, reliable internet connectivity, relevant digital skills, and quality career information. Differences in students' socioeconomic circumstances, digital competence, geographical location, and access to institutional support may therefore influence the extent to which they benefit from digital interventions. Evidence linking digital competence with career adaptability further suggests that students' ability to use digital resources may be an important condition for deriving career benefits from technology.

6. There is a human technology integration gap. Existing research provides limited evidence comparing technology-only career guidance with approaches that combine digital tools and professional counsellor support. This is particularly relevant in university settings, where digital platforms may increase accessibility and personalisation but may not adequately address complex emotional, contextual, cultural, and individual career concerns. Nigerian evidence on career guidance has already emphasised the continuing importance of strengthening professional career support within higher education (Okolie et al., 2020).
7. There is a theory-to-practice gap. Few empirical studies explicitly examine how digital career guidance tools facilitate the processes proposed by Career Construction Theory, particularly career concern, control, curiosity, and confidence, or the self-efficacy and contextual mechanisms emphasised by Social Cognitive Career Theory. Future research should therefore move beyond determining whether digital tools are useful and examine how, for whom, and under what conditions they enhance career adaptability.

3.4 Implications for Guidance and Counselling Practice

The findings of this review have important implications for Guidance and Counselling practice in Nigerian universities.

1. University counsellors should incorporate appropriate digital career guidance tools into existing career services. Online career assessments, digital career information platforms, virtual counselling sessions, career-planning applications, and AI-supported resources can provide students with flexible and accessible opportunities for career exploration and planning. However, such tools should complement rather than replace professional counselling, particularly where students require personalised interpretation, emotional support, or assistance with complex career decisions.
2. Counsellors should use digital tools to strengthen the four dimensions of career adaptability: concern, control, curiosity, and confidence. Digital career-planning activities can help students develop concern by encouraging them to think about their future careers; career assessments and decision-support tools can strengthen control by facilitating informed choices; online occupational information can promote curiosity through exploration of alternative careers; and simulations, skills-development activities, and structured feedback can enhance confidence in managing career-related tasks and transitions.
3. Counsellors should develop students' digital career literacy alongside traditional career competencies. Students need to know how to search for reliable occupational information, evaluate online career resources, use digital assessment tools appropriately, construct professional digital profiles, and critically evaluate recommendations generated by artificial intelligence. This is particularly important because digital competence may influence students' ability to derive meaningful career benefits from technology.
4. Counsellors should adopt a blended human–digital approach to career guidance. Digital platforms can improve accessibility, efficiency, and continuity of career services, while professional counsellors provide the human judgement, contextual understanding, ethical oversight, and interpersonal support that technology cannot fully replicate. This approach is consistent with evidence showing that students may value the convenience of online career support while still appreciating human interaction (Kim, 2022; Zhang & Zhou, 2025).
5. Counsellors should ensure that digital career guidance is inclusive and accessible. Students

with limited digital skills, inadequate internet access, or fewer technological resources may require additional support. Universities should therefore provide appropriate orientation, alternative access channels, and guided use of digital career services to reduce inequalities in participation.

6. Counsellors should continuously evaluate the effectiveness of digital career guidance interventions. Rather than measuring only students' satisfaction or willingness to use technology, evaluation should include meaningful career outcomes such as career adaptability, career decision-making self-efficacy, career exploration, career planning, and employability. Such systematic evaluation would enable university counselling units to identify effective tools and improve services based on evidence.

3.5 Recommendations for Nigerian Universities

Based on the empirical evidence reviewed, the following recommendations are made:

1. Career centres and counselling units should provide students with access to credible online career information, digital assessment tools, virtual counselling, career-planning platforms, and other appropriate technologies.
2. Digital tools should complement professional counsellor-led services rather than replace them. Counsellors should provide interpretation, personalised guidance, ethical oversight, and follow-up support alongside technology-enabled services.
3. Orientation and career-development programmes should equip students with skills for locating and evaluating reliable career information, using digital career resources, developing professional digital profiles, and critically assessing AI-generated career recommendations.
4. Digital interventions should include activities that promote career concern, control, curiosity, and confidence, enabling students to prepare for changing occupational requirements and manage transitions from university to employment.
5. Institutions should provide adequate internet connectivity, accessible digital platforms, and opportunities for students with limited technological resources or digital skills to participate effectively in technology-supported career guidance.
6. Counselling units should regularly assess the effectiveness of digital interventions using outcomes such as career adaptability, career decision-making self-efficacy, career planning, career exploration, and employability rather than relying solely on students' satisfaction or usage rates.
7. Counsellors, researchers, information technology specialists, and university administrators should collaborate in developing and evaluating digital career guidance systems that reflect the educational, cultural, technological, and labour-market realities of Nigerian students.
8. Where artificial intelligence is used, universities should establish appropriate procedures concerning privacy, informed use of student data, transparency of recommendations, accuracy of career information, and the potential for algorithmic bias. Human professional oversight should remain central to high-stakes career decisions.

4.1 Conclusion

This review examined empirical evidence on digital career guidance tools and career adaptability among undergraduate students, with particular attention to their relevance within Nigerian universities. The evidence indicates that online career-planning programmes, digital career counselling, digital competence, and AI-supported career guidance have considerable potential to strengthen students' career-related capabilities. Intervention studies have reported improvements in career adaptability and related outcomes, while broader evidence suggests that digital resources

can facilitate career exploration, decision-making, confidence, and employability (Kim, 2022; Zhang & Zhou, 2025; Zhou et al., 2023). However, the strength of the evidence varies across technologies, outcomes, and research designs. The review further shows that Nigerian evidence remains comparatively limited. Existing Nigerian studies establish the importance of career adaptability, career guidance, career self-efficacy, and employability among university students, but relatively few studies have directly evaluated the effectiveness of digital career guidance tools in developing career adaptability. Nigerian students' favourable perceptions of AI-supported career guidance provide an encouraging basis for further development, but acceptance and perceived usefulness should not be interpreted as evidence of intervention effectiveness.

Overall, digital career guidance should be regarded as a valuable complement to professional Guidance and Counselling rather than a substitute for counsellor involvement. Its effectiveness is likely to depend on the quality of career information, students' digital competence, accessibility, appropriate professional support, and the extent to which digital activities address the core dimensions of career adaptability. Nigerian universities should therefore pursue evidence-based, accessible, ethically governed, and culturally responsive digital career guidance services.

Future research should prioritise Nigerian experimental and quasi-experimental studies that directly measure changes in career adaptability following exposure to specific digital interventions. Longitudinal and mixed-method studies are also needed to determine the sustainability of intervention effects and to explain how students experience technology-supported career guidance. Strengthening this evidence base will enable universities and counsellors to make informed decisions about the design, implementation, and evaluation of digital career guidance services for undergraduate students.

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