ISSN: 2716-9189 Category B E-ISSN: 2676-1750
Journal of Studies in Language, Culture, and Society (JSLCS). (09) 03, 2026. (PP. 34-54)
Received: 13/12/2025 Accepted: 18/07/2026 Published: 30/09/2026

MULTIDISCIPLINARY INVESTIGATION OF 21ST CENTURY SKILLS INTEGRATION IN ALGERIAN HIGHER EDUCATION

Somia Boudinar[1]
[1] **DEPENEL Laboratory, Mohamed Lamine Debaghine, Setif 2 University**
s.boudinar@univ-setif2.com

Abstract: The development of 21st-century skills, such as critical thinking, creativity, collaboration, communication, and digital literacy, has become a global priority in higher education, positioning universities as central actors in preparing graduates for increasingly complex and dynamic professional environments. In Algeria, this emphasis has sparked ongoing debates about how to embed these competencies in teaching and learning. While policy reforms have highlighted the need for modernization, the perspectives of instructors, who play a pivotal role in implementing such reforms, remain underexplored. This paper presents findings from an exploratory qualitative study examining Algerian higher education instructors' views on integrating 21st-century skills into their pedagogy. Data were collected via online open-ended questionnaires completed by 20 instructors from diverse disciplinary backgrounds at Setif 1 and Setif 2 Universities, yielding a broad range of insights across the academic spectrum. The findings revealed that all participants recognized the importance of integrating 21st-century skills into higher education; however, their interpretations and prioritization of these competencies varied by disciplinary context. Participants identified several barriers to effective implementation, including overcrowded classrooms, inadequate digital infrastructure, content-heavy curricula, examination-oriented assessment practices, and insufficient discipline-specific professional development. At the same time, they highlighted emerging opportunities associated with English-medium instruction, the expansion of digital learning environments, entrepreneurship initiatives, and increased access to open educational resources, all of which were perceived as facilitating the development of transferable competencies. The study concludes that the successful integration of 21st-century skills in Algerian higher education requires a comprehensive institutional approach that extends beyond policy reform to include curriculum redesign, assessment reform, sustained professional development, and enhanced institutional support for pedagogical innovation.

Keywords: 21st-century skills; Algerian higher education; instructors' perspectives; pedagogical reform

How to cite the article:

Boudinar, S. (2026). Multidisciplinary Investigation of 21st Century Skills Integration in Algerian Higher Education. *Journal of Studies in Language, Culture, and Society (JSLCS), 9*(3), 34-54

© 2026 The Author(s). This open access article is published by the *Journal of Studies in Language, Culture, and Society* (JSLCS) under the Creative Commons Attribution 4.0 International Licence (CC BY 4.0), https://creativecommons.org/licenses/by/4.0/

[1] **Corresponding author :** Somia Boudinar, **ORCID ID:** https://orcid.org/0009-0000-1941-7840

1. Introduction

The rapid technological, economic, and social changes of the twenty-first century have reshaped expectations for higher education institutions worldwide. Universities are no longer responsible solely for transmitting disciplinary knowledge; they are also expected to equip students with a range of competencies that enable them to succeed in increasingly complex and dynamic environments. These competencies, commonly referred to as 21st-century skills, include critical thinking, creativity, collaboration, communication, problem-solving, and digital literacy. International organizations such as the Partnership for 21st Century Learning (P21) emphasize that these skills are essential for preparing graduates to participate effectively in the global knowledge economy and to adapt to ongoing societal and technological changes.

In Algeria, higher education has undergone substantial reforms since the introduction of the Licence–Master–Doctorat (LMD) system in 2004, aimed at modernizing university education, improving quality, promoting student mobility, and enhancing graduates' employability in line with international standards. However, research indicates that implementation has primarily emphasized structural, administrative, and curricular changes, while pedagogical transformation has progressed more slowly. Scholars have reported persistent challenges in translating policy objectives into classroom practice, including limited adoption of learner-centered pedagogies, inadequate pedagogical training, and resistance to change among university instructors (Miliani, 2017). More recently, Azzi and Mebarki (2025) argue that although the LMD reform advocates a shift from teacher-centered to learner-centered instruction, many university classrooms continue to rely on traditional teaching approaches, suggesting that instructors require greater support to implement innovative pedagogical practices effectively. Consequently, relatively little attention has been devoted to understanding how instructors perceive and integrate 21st-century skills into their teaching, despite their pivotal role in deciphering educational reforms into meaningful learning experiences.

Recent Algerian research has examined aspects of 21st-century skills, particularly digital literacy and technology integration. For example, Bahloul and Mouas (2025) and Amarouche and Bilouk (2025) highlighted the importance of digital competencies among university instructors. Other studies, such as Ghobrini (2020) and Boulmerka (2026), explored the development of skills such as collaboration, communication, creativity, and critical thinking within EFL contexts. However, these studies tend to focus on specific skills, technologies, or language-learning settings and do not provide a comprehensive understanding of how higher education instructors across disciplines perceive and implement 21st-century skills.

Therefore, a significant gap remains in understanding how Algerian higher education instructors conceptualize 21st-century skills, the challenges they face in integrating them into their teaching practices, and the strategies they employ to foster these competencies among students. Addressing this gap is important because instructors are key agents in promoting educational innovation and preparing students for contemporary academic and professional demands.

Accordingly, this study aims to investigate Algerian higher education instructors' insights into integrating 21st-century skills into teaching and learning. The specific objectives are:

1. To explore how instructors conceptualize 21st-century skills within their disciplines.
2. To identify barriers that hinder the integration of these skills into teaching practices.

3. To examine opportunities and strategies that instructors consider viable for embedding such competencies in higher education.

The following research questions guide the study:

1. How do Algerian higher education instructors understand and define 21st-century skills?

2. What challenges do they encounter in integrating these skills into their teaching practices?

3. What opportunities and strategies do they identify for fostering these competencies among students?

The study holds significance at both theoretical and practical levels. Theoretically, it contributes to the limited body of research on 21st-century skills in Algerian academia by foregrounding instructors' voices, a perspective often marginalized in policy-driven debates. In practical terms, the findings provide valuable insights for policymakers, curriculum designers, and institutional leaders seeking to align Algerian higher education with global educational priorities.

2. Literature Review

2.1. 21st Century Skills General Overview

The emergence of knowledge economies, globalization, and rapid technological advancement has fundamentally transformed the competencies expected of university graduates. Consequently, the concept of 21st-century skills has become central to educational research and policy, emphasizing the development of transferable competencies alongside disciplinary knowledge (Voogt & Roblin, 2012; Trilling & Fadel, 2009).

Although definitions vary, scholars generally agree that these skills encompass cognitive, interpersonal, and technological competencies required for lifelong learning and employability. Trilling and Fadel (2009) define them as the knowledge and skills students need to succeed in work and life, whereas Binkley et al. (2012) describe them as competencies relating to ways of thinking, ways of working, tools for working, and living in the world. Similarly, Dede (2010) argues that their importance lies not in their novelty but in the increasing complexity of applying them in technology-rich and globally interconnected environments. Chalkiadaki (2018) further conceptualizes 21st-century skills as a multidimensional construct that integrates cognitive, interpersonal, and intrapersonal competencies.

Despite differences in terminology, international scholarship consistently identifies critical thinking, creativity, collaboration, communication, digital literacy, and problem-solving as the core competencies required for success in contemporary societies (Silva, 2009; Suto, 2013; González-Pérez & Ramírez-Montoya, 2022). Rather than representing a fixed set of abilities, these skills constitute an evolving framework that responds to technological, economic, and social changes.

2.2. Core Frameworks and Models

Three international frameworks have significantly shaped contemporary understanding of 21st-century skills: the Partnership for 21st Century Learning (P21), the Assessment and Teaching of 21st Century Skills (ATC21S) project, and the OECD Learning Framework 2030.

The P21 framework organizes competencies into Learning and Innovation Skills, Information, Media and Technology Skills, and Life and Career Skills, placing the 4Cs, critical thinking, creativity, collaboration, and communication, at the centre of educational

practice (Trilling & Fadel, 2009). Although widely adopted, it has been criticised for providing limited guidance regarding implementation and assessment (Silva, 2009; Voogt & Roblin, 2012).

The ATC21S framework expands this perspective by integrating competency assessment through four domains: ways of thinking, ways of working, tools for working, and living in the world (Binkley et al., 2012). Likewise, the OECD Learning Framework 2030 extends the discussion beyond employability by emphasising learner agency, ethical reasoning, responsible citizenship, and lifelong learning (OECD, 2019).

Despite differences in structure, these frameworks converge in highlighting higher-order thinking, communication, collaboration, creativity, and digital competence as essential graduate attributes (Schleicher, 2012; Voogt & Roblin, 2012; González-Pérez & Ramírez-Montoya, 2022). Collectively, they provide the theoretical foundation for examining instructors' perceptions of 21st-century skills.

2.3. Key Components and Skill Categories

Although 21st-century skills frameworks differ in terminology, they consistently identify critical thinking, collaboration, communication, creativity, and digital literacy as core competencies required for academic, professional, and lifelong success (Voogt & Roblin, 2012; Binkley et al., 2012). These competencies complement disciplinary knowledge and enable learners to adapt to the demands of rapidly changing societies (Schleicher, 2012; Joynes et al., 2019).

2.3.1. Critical Thinking and Problem Solving

Critical thinking is widely regarded as a fundamental 21st-century skill because it enables learners to analyze information, evaluate evidence, and solve complex problems (Binkley et al., 2012). Dede (2010) argues that higher education should move beyond knowledge transmission to foster inquiry and problem-solving, while Lai and Viering (2012) emphasize that authentic assessment is needed to evaluate these higher-order cognitive skills effectively.

2.3.2. Collaboration and Communication

Collaboration and communication are essential for effective teamwork and knowledge sharing in academic and professional settings (Schleicher, 2012). Research indicates that collaborative learning enhances both academic achievement and interpersonal competence, particularly when supported by digital technologies and learner-centred instructional approaches (Redecker, 2017; Joynes et al., 2019).

2.3.3. Creativity and Innovation

Creativity enables learners to generate original ideas, adapt to new situations, and develop innovative solutions to complex challenges. Binkley et al. (2012) identify creativity as a key component of 21st-century learning, while Dede (2010) highlights the importance of instructional approaches that promote inquiry, flexibility, and innovation.

2.3.4. Digital Literacy and Technology Skills

Digital literacy extends beyond technical competence to include the ability to access, evaluate, create, and communicate information effectively using digital technologies (Redecker, 2017). As digital transformation reshapes higher education, teachers' digital competence is crucial for integrating technology into teaching and fostering students' 21st-century skills (Anagün et al., 2016; González-Pérez & Ramírez Montoya, 2022).

2.4 Integrating 21st-Century Skills in Higher Education

Integrating 21st-century skills requires more than curriculum reform; it demands changes in pedagogy, assessment, technology use, and institutional culture (Dede, 2010). Universities are increasingly expected to prepare graduates who can solve complex problems, collaborate across disciplines, adapt to technological change, and engage in lifelong learning (OECD, 2019).

Research consistently identifies learner-centred pedagogies as the most effective means of developing these competencies. Project-based learning, inquiry-based learning, problem-based learning, and collaborative learning encourage students to construct knowledge actively while developing communication, creativity, collaboration, and critical thinking (Bell, 2010; Hmelo-Silver, 2004). Similarly, experiential learning through internships, case studies, simulations, and community engagement promotes the transfer of knowledge to authentic professional contexts (Herrington & Oliver, 2000).

Digital technologies have further expanded opportunities for competency development. Learning management systems, collaborative platforms, artificial intelligence, and virtual learning environments can foster interaction and self-directed learning when integrated within sound pedagogical designs (Redecker, 2017; González-Pérez & Ramírez-Montoya, 2022). However, technology alone cannot improve learning outcomes without appropriate instructional strategies.

Assessment also plays a crucial role. Traditional examinations inadequately capture complex competencies such as creativity and collaboration, leading scholars to advocate for authentic assessment approaches, including portfolios, project-based assessments, reflective journals, and peer assessments (Binkley et al., 2012).

Ultimately, successful implementation depends largely on instructors. Their pedagogical beliefs, disciplinary backgrounds, digital competence, and willingness to adopt learner-centred approaches strongly influence the effectiveness of competency-based education (Voogt & Roblin, 2012). Consequently, continuous professional development has become essential for enabling instructors to integrate innovative pedagogies effectively (Mahmud & Wong, 2022).

2.5 Challenges to Integrating 21st-Century Skills

Despite the global emphasis on 21st-century skills, their integration into higher education remains challenging. Although many educational systems have adopted competency-based curricula, implementation often falls short of policy aspirations, as universities continue to prioritize content delivery and examination-oriented learning over competencies such as critical thinking, creativity, collaboration, and communication (Voogt & Roblin, 2012; Schleicher, 2012). This highlights the need for institutional, pedagogical, and cultural transformation beyond curriculum reform.

A major obstacle is the persistence of teacher-centred pedagogy, which limits active learning, collaboration, and higher-order thinking (Dede, 2010; Anagün et al., 2016). Assessment practices also remain misaligned with competency-based education, relying largely on traditional examinations rather than authentic assessment methods. Binkley et al. (2012) and Lai and Viering (2012) argue that portfolios, project-based learning, and performance-based assessments are more effective in evaluating complex 21st-century competencies.

Implementation is further constrained by institutional challenges, including limited resources, inadequate technological infrastructure, large class sizes, and insufficient administrative support (Joynes et al., 2019). Additionally, many university instructors lack adequate preparation in learner-centred pedagogy, assessment, and educational technology. Continuous professional development is therefore essential to strengthen teachers' capacity to implement competency-based education (Schleicher, 2012), while teachers' own perceptions of their 21st-century skills competence influence their willingness to adopt innovative practices (Anagün et al., 2016).

Although digital technologies can facilitate collaboration, creativity, and self-directed learning, their effectiveness depends on teachers' pedagogical and digital competence rather than technology alone (Redecker, 2017). Resistance to change also remains a significant barrier, reinforcing traditional teaching practices. Consequently, the successful integration of 21st-century skills requires coordinated reforms in curriculum, assessment, teacher preparation, institutional support, and organizational culture (Joynes et al., 2019; Voogt & Roblin, 2012; Schleicher, 2012; Binkley et al., 2012; Lai & Viering, 2012; Anagün et al., 2016).

2.6 Empirical Studies in Algeria

Compared with international research, empirical studies on 21st-century skills in Algeria remain limited. Existing research has primarily examined digital transformation, English language teaching, or technology integration rather than instructors' broader conceptualizations of competency-based education.

Mehdaoui and Benabed (2022**)** explored Algerian EFL university teachers' awareness of 21st-century skills. Their findings revealed a generally high level of awareness, with teachers recognizing communication, collaboration, creativity, critical thinking, and problem-solving as essential competencies for contemporary learners. Participants also expressed positive attitudes towards integrating these skills into university teaching. Nevertheless, they identified several obstacles, including insufficient professional development, overcrowded classrooms, limited technological infrastructure, rigid curricula, and assessment systems that continue to prioritize memorization over higher-order thinking.

Ghobrini (2020) found that project-based learning enhanced collaboration, autonomy, leadership, and problem-solving among Algerian EFL students, underscoring the value of learner-centered pedagogy. Likewise, Bahloul and Mouas (2025) reported that instructors' digital competence significantly influenced teaching effectiveness, while Amarouche and Bilouk (2025) demonstrated that digital literacy supported teachers' professional development. However, both studies focused primarily on technology-related competencies.

Boulmerka (2026) further revealed that Algerian EFL teachers hold positive attitudes toward integrating the 4Cs, while identifying persistent barriers, including limited institutional support, insufficient professional development, and traditional assessment practices. These findings suggest that favourable teacher attitudes alone are insufficient for effective classroom implementation.

Although these studies provide valuable insights, they remain discipline-specific and focus primarily on EFL education. Little is known about how university instructors from different academic disciplines conceptualise, implement, and experience 21st-century skills within Algerian higher education. Addressing this gap, the present study investigates instructors' perceptions of these competencies, the challenges they encounter, and the opportunities they identify for integrating 21st-century skills into university teaching. By foregrounding instructors' voices across disciplines, the study contributes context-specific

evidence to support future curriculum reform, institutional policy, and professional development initiatives.

3. Methodology

3.1 Research Design

This study adopted an exploratory qualitative survey design to explore Algerian higher education instructors' perspectives on integrating 21st-century skills into university teaching and learning. The selection of a qualitative approach was guided by the exploratory nature of the research questions, which sought to understand how instructors conceptualize 21st-century skills, the challenges they encounter in implementing them, and the opportunities they perceive to promote these competencies in their pedagogical practices. Such questions require an interpretive understanding of participants' experiences, beliefs, and meanings rather than the measurement of predetermined variables, making qualitative inquiry the most appropriate methodological approach (Creswell & Poth, 2018; Merriam & Tisdell, 2016). Because the integration of 21st-century skills in Algerian higher education remains underexplored, a qualitative design enabled an in-depth examination of instructors' interpretations and experiences while allowing unexpected issues to emerge inductively from the data.

3.2 Research Context

The study was conducted within the Algerian higher education sector, focusing on instructors' insights into integrating 21st-century skills into the sector. Given the limited empirical research addressing this topic within the national context, an exploratory qualitative design was adopted. This design was appropriate for examining complex constructs such as perceptions and lived experiences and for generating an in-depth understanding of a phenomenon that remains under-researched from the standpoint of Algerian university instructors. The selected research setting was well suited to developing a nuanced understanding of instructors' experiences across disciplinary and institutional contexts.

3.3 Participants

Participants were selected through purposive sampling, a nonprobability strategy widely used in qualitative research to identify information-rich cases that yield meaningful insights into the phenomenon under investigation (Patton, 2015). Purposive sampling aims to recruit participants with direct knowledge and experience relevant to the research questions (Creswell & Poth, 2018). To ensure the relevance and richness of the data, participants were required to meet the following inclusion criteria: (a) be university instructors at Ferhat Abbas University, Setif 1 or Mohamed Lamine Debaghine University, Setif 2; (b) have at least one year of university teaching experience; (c) be actively involved in undergraduate teaching during the data collection period; and (d) be willing to participate voluntarily and provide informed consent. To capture diverse perspectives on the integration of 21st-century skills, instructors from different academic disciplines and with varying levels of teaching experience were deliberately included.

3.3.1. Instructors' Profile

The study involved twenty (N = 20) university instructors recruited from Setif 1 University and Setif 2 University. Participants were drawn from five academic disciplines**,** with four instructors representing each field**:** Natural Sciences (n = 4), Engineering (n = 4), Business and Economics (n = 4), Social Sciences (n = 4), and Letters and Languages (n = 4). This balanced disciplinary distribution enabled the study to capture a wide range of instructional contexts and pedagogical practices.

Regarding teaching experience, six instructors had less than five years of university teaching, seven had between five and ten years, and seven had more than ten years. This range represented early-career, mid-career, and senior academics. All participants were actively engaged in undergraduate teaching, and nine instructors also reported teaching at the postgraduate level. Their professional duties included course design, classroom instruction, assessment, and student supervision. Additionally, thirteen instructors reported prior participation in pedagogical training or professional development programs, particularly those focused on innovative teaching methods and the integration of skills-based education.

All in all, the participant group's composition, including institutional affiliation, disciplinary background, and teaching experience, offered a diverse and well-rounded profile, increasing the credibility and transferability of the study's findings.

3.4 Research Instrument

Data were collected via an online open-ended questionnaire comprising 15 open-ended questions. The questionnaire was designed to elicit detailed descriptions of instructors' understandings, experiences, and perceptions regarding the integration of 21st-century skills into higher education.

The choice of an open-ended survey was both methodologically and practically justified. Methodologically, it aligned with the study's objective of exploring instructors' understandings and experiences across different disciplinary contexts rather than developing individual life histories or generating grounded theory. Practically, university instructors often have demanding teaching, research, and administrative responsibilities that make scheduling lengthy interviews challenging. The online open-ended survey enabled participants to complete the questionnaire at their convenience and to provide reflective, detailed written responses in their own words.

The instrument comprised four sections. The first gathered demographic and professional information, including participants' academic discipline, teaching experience, courses taught, and previous pedagogical training. The remaining sections explored four broad areas:

1. Instructors' conceptualizations of 21st-century skills;
2. Perceived importance of these competencies in higher education;
3. Challenges encountered during implementation; and
4. Opportunities and strategies for promoting 21st-century skills within university teaching.

Open-ended questions were selected because they allow participants to articulate their experiences and meanings without being constrained by predetermined response categories (Merriam & Tisdell, 2016). Such questions encourage reflective responses and are particularly suitable for exploratory research in which the researcher seeks to understand participants' interpretations. To encourage comprehensive responses, participants were informed that there were no correct or incorrect answers and invited to illustrate their views with examples from their own teaching practice.

3.4.1 Pilot Study

Before the main data collection, the questionnaire was pilot-tested with three university instructors who shared characteristics with the target participants but were excluded from the final sample. Pilot testing is recommended to assess the clarity, relevance, and comprehensibility of qualitative research instruments before full-scale implementation

(Creswell & Creswell, 2018). Feedback from the pilot led to minor revisions to improve wording, eliminate ambiguity, reduce overlap between questions, and improve the overall sequence of items. These refinements enhanced the instrument's face validity and improved alignment between the questionnaire and the study's research questions.

3.5 Data Collection Procedures

After institutional approval, invitations containing an information sheet, informed consent statement, and a secure link to the questionnaire were distributed electronically to eligible participants. Participation was entirely voluntary. The questionnaire remained available for four weeks, with reminder emails sent to encourage participation. Participants completed the questionnaire independently, at a time and location of their choosing. The online format offered several methodological advantages. It reduced scheduling constraints tied to instructors' academic responsibilities, minimized interviewer influence, and gave participants sufficient time to reflect before composing their responses, thereby enhancing the richness of the qualitative data (Jansen, 2010).

3.6 Data Analysis

The data were analyzed using Reflexive Thematic Analysis (RTA) following Braun and Clarke's (2006, 2019, 2021) six-phase analytical framework. RTA was selected for its theoretical flexibility and suitability for exploring patterns of shared meaning across qualitative datasets without being tied to a specific epistemological tradition. The analysis involved six iterative stages:

1. familiarisation with the dataset through repeated reading;
2. systematic generation of initial codes;
3. construction of preliminary themes by grouping conceptually related codes;
4. reviewing and refining themes in relation to both coded extracts and the complete dataset;
5. defining and naming themes; and
6. producing the final analytical narrative.

Coding was conducted manually to facilitate continuous engagement with the data. Initial semantic codes were generated inductively from participants' responses and progressively refined into broader interpretive categories. Throughout the analysis, reflective memos were maintained to document coding decisions, analytical insights, and the evolution of themes. This audit trail enhanced transparency and ensured that interpretations remained grounded in participants' accounts.

3.7 Ethical Considerations

The study adhered to established ethical principles for educational research. Participation was voluntary, and informed consent was obtained from all participants before data collection. Participants were informed of the study's purpose, the voluntary nature of participation, their right to withdraw at any time, and the measures taken to ensure confidentiality. To preserve anonymity, all participants were assigned identification codes (e.g., P1–P20), and no personally identifiable information was included in the reporting of findings. All collected information was used exclusively for academic research purposes.

4. Results

4.1 Conceptualizations and Valuation of 21st-Century Skills

The analysis of participants' responses revealed a strong consensus regarding the importance of these competencies in contemporary higher education. All twenty participants affirmed the importance of embedding 21st-century skills in higher education, using emphatic descriptors such as “essential,” “indispensable,” and “the key to employability.”

Regardless of disciplinary affiliation, all participants acknowledged that graduates require skills extending beyond disciplinary knowledge to succeed in increasingly complex academic and professional environments. However, although participants agreed on the importance of these competencies, they differed considerably in how they conceptualized, interpreted, and prioritized individual skills. Two interrelated subthemes emerged from the analysis:

4.1.1 Disciplinary Differences in Skill Conceptualization

The analysis revealed notable disciplinary differences in how instructors understood and defined 21st-century skills. Although participants generally agreed on the importance of these competencies, their interpretations reflected the epistemological traditions and professional expectations of their respective disciplines. These variations were particularly evident in participants' conceptualizations of critical thinking, creativity, and digital literacy.

Critical thinking emerged as one of the most frequently discussed competencies; however, its meaning differed considerably across disciplines. Instructors from Letters and Languages viewed critical thinking as an interpretive and reflective process centred on analysing texts, questioning assumptions, and examining multiple perspectives. As P17 explained: "Critical thinking in my field is not about solving a problem efficiently; it is about questioning texts, analysing authors' intentions, and examining the social and cultural meanings embedded in discourse." In contrast, participants from engineering and technology-oriented disciplines associated critical thinking with logical reasoning and systematic problem-solving. According to P7: "Critical thinking involves analysing complex problems logically, breaking them into manageable parts, identifying patterns, and selecting the most appropriate technical solution." These responses demonstrate that although instructors recognised critical thinking as a core graduate competency, they understood and applied it differently, depending on the intellectual traditions of their disciplines.

Similar disciplinary variation was evident in participants' understanding of creativity. Engineering instructors described creativity as the capacity to develop innovative solutions within technical and practical constraints. P5 noted: "Creativity means designing innovative solutions to technical problems while working within engineering requirements and available resources." Participants from Business and Economics associated creativity with entrepreneurship, innovation, and the identification of new market opportunities. As P9 explained: "Creativity is closely linked to entrepreneurial thinking. Students need to recognise opportunities, generate innovative ideas, and transform them into viable projects." By comparison, instructors from Letters and Languages viewed creativity primarily as a process of interpretation and imagination. For instance, P8 stated: "Creativity is the ability to interpret texts in original ways, express ideas creatively, and encourage students to explore different perspectives." These responses illustrate that participants attached different meanings to creativity depending on the knowledge, practices, and professional expectations characteristic of their disciplines.

Digital literacy also emerged as a competency interpreted differently across academic fields. Participants from engineering and computing disciplines emphasised technical competence and the effective use of digital technologies. P8 explained: "Digital literacy means mastering programming languages, specialised software, and the digital tools that students will use in their professional careers." Conversely, instructors from the humanities emphasised critical and ethical engagement with digital information. According to P19: "Digital literacy is not only about using technology; it also involves evaluating the credibility of online information, and understanding ethical issues." These findings indicate that instructors' conceptualizations of digital literacy extended beyond technical proficiency and reflected the specific educational priorities of their disciplines. While technology-oriented instructors focused on operational competence, humanities instructors highlighted critical evaluation and responsible participation in digital environments.

Overall, the findings suggest that participants shared a common belief in the importance of 21st-century skills but interpreted these competencies through discipline-specific perspectives. Rather than indicating disagreement, these differences illustrate how disciplinary knowledge shapes instructors' understandings of transferable skills and influences how they seek to integrate them into teaching and learning.

4.1.2 Estimation and Prioritization of Skills

Although all participants unanimously acknowledged the importance of 21st-century skills, the analysis revealed considerable variation in the competencies they prioritised within their teaching practices. These differences reflected not only the learning outcomes associated with individual disciplines but also instructors' underlying beliefs about the knowledge, abilities, and dispositions that students require to succeed in their respective academic and professional contexts.

Participants in the Social Sciences consistently identified critical thinking and communication as the most fundamental competencies. They viewed these skills as inseparable from disciplinary inquiry, enabling students to analyze complex social issues, evaluate competing perspectives, and construct evidence-based arguments. As P14 explained: "If my students cannot critically examine a social policy or communicate their analysis persuasively, then the rest of what I teach loses much of its value." For these participants, developing transferable skills was not seen as an external educational requirement but as an inherent dimension of disciplinary learning. Critical thinking and communication are, therefore, regarded as essential intellectual practices that underpin both academic achievement and informed civic engagement.

In contrast, instructors from technology-oriented disciplines placed greater emphasis on problem-solving and digital literacy. Participants argued that rapid technological advancement and changing labour-market expectations require graduates to possess strong analytical and technical competencies. According to P2: "In my field, students must be able to solve problems systematically and use digital tools confidently. These competencies are essential because they reflect the expectations of both scientific research. Similarly, engineering instructors viewed technical competence as closely linked to employability, emphasising that graduates must be prepared to work in increasingly digital and “innovation-driven environments”. Consequently, digital literacy was perceived not merely as the ability to use technology but as a professional competency central to disciplinary practice.

Participants from Letters and Languages prioritised creativity and communication, emphasising their importance for interpretation, critical reflection, and effective expression. Rather than viewing these competencies as recently emerging educational priorities, several instructors argued that they have long been embedded within the humanities. As P20 observed:

"We have always encouraged students to think critically, interpret creatively, and express themselves in an efficient way. These abilities are the core in our domain." This perspective suggests that participants did not necessarily reject the concept of 21st-century skills; rather, they questioned the novelty of the terminology and argued that many of these competencies have traditionally formed part of humanities education.

Despite these disciplinary differences, participants broadly agreed that universities should promote a shared institutional commitment to developing transferable competencies across programmes. However, they also stressed that such a framework should recognise disciplinary diversity rather than impose a uniform interpretation of 21st-century skills. As P15 (Social Sciences) explained: "Universities need a common vision for integrating these skills, but implementation can be flexible according to the goals and teaching approaches of different disciplines."

Taken together, these findings demonstrate that instructors shared a strong commitment to preparing students with competencies that extend beyond disciplinary knowledge. However, the relative importance assigned to individual skills varied according to disciplinary priorities and professional expectations. Rather than indicating disagreement regarding the value of 21st-century skills, these differences reflect the diverse ways in which academic disciplines conceptualise graduate competence and the pedagogical approaches through which these competencies are cultivated.

4.2 Perceived Barriers to the Integration of 21st-Century Skills

Regarding the challenges Algerian higher education instructors face in integrating 21st-century skills into their teaching practices, the analysis of participants' responses revealed that they perceived these challenges as interconnected rather than isolated. Participants consistently described a network of structural, institutional, and pedagogical constraints that collectively limited opportunities for implementing learner-centred and competency-based approaches. Rather than viewing these barriers as independent issues, instructors emphasized that they reinforce one another, creating a system that restricts pedagogical innovation. As P6 (Engineering) explained: "The obstacles are not separate; they work together. Even if we improve one aspect, such as technology, the lack of sufficient time and the large class sizes prevent meaningful integration. Everything is interconnected." This perspective was echoed across disciplines, suggesting that the successful integration of 21st-century skills requires comprehensive institutional reform rather than isolated interventions.

4.2.1 Structural and Infrastructural Constraints

Structural and infrastructural limitations emerged as the most frequently reported barriers. Participants identified overcrowded classrooms and inadequate digital infrastructure as major obstacles that significantly hindered the implementation of active learning strategies to foster collaboration, communication, critical thinking, and problem-solving.

Large class sizes were consistently described as mismatched with learner-centred pedagogy. Participants reported teaching classes ranging from 80 to over 200 students, making it extremely difficult to organise discussions, collaborative projects, classroom interaction, and continuous formative assessment. As P5 (Engineering) questioned: "How can I implement collaborative projects with nearly 180 students in a lecture hall?" Similarly, P11 (Business and Economics) observed: "With such large groups, much of the lecture is devoted to classroom management. Under these conditions, ensuring interaction becomes extremely difficult." These responses indicate that classroom size was perceived not merely as a logistical inconvenience but as a structural factor shaping instructional decisions. Participants

believed that overcrowded classrooms inevitably encouraged teacher-centred instruction while reducing opportunities for collaborative learning and active student engagement.

Digital infrastructure represented a second major concern. Although participants acknowledged recent institutional investment in educational technologies, they generally believed that available resources remained insufficient to support technology-enhanced learning. According to P10 (Business and Economics): "We are encouraged to use digital platforms, yet the internet connection frequently fails when large numbers of students attempt to access online resources at the same time." Likewise, P3 (Natural Sciences) explained: "The university has introduced digital technologies, but the lack of computer laboratories, internet access, and old-fashioned equipment often prevent their effective use." Participants perceived a considerable gap between institutional aspirations for digital transformation and the practical realities of classroom implementation. While universities promoted technology-enhanced learning, instructors argued that inconsistent access to digital resources frequently undermined their efforts to integrate digital literacy into everyday teaching.

4.2.2 Curricular and Assessment Rigidity

A second major sub-theme concerned the structure of university curricula and prevailing assessment practices. Participants argued that both curriculum design and assessment systems remained heavily content-oriented, leaving limited opportunities to cultivate higher-order competencies associated with 21st-century learning. Many instructors described the prescribed curricula as excessively dense, requiring extensive content coverage within limited teaching time. Consequently, activities such as project-based learning, collaborative inquiry, classroom discussions, and authentic problem-solving were often sacrificed to ensure completion of the official syllabus. As P4 (Natural Sciences) explained: "The programme contains too much material that must be completed before examinations. There is very little time available for projects that encourage critical thinking and collaboration." Similarly, P7 (Engineering) noted: "We are always encouraged to integrate new skills, but there is no additional time to do so." Participants, henceforth, perceived curriculum overload as limiting pedagogical flexibility and reducing opportunities to adopt innovative teaching methods.

Assessment practices were viewed as an equally significant constraint. Across all disciplinary groups, instructors criticised the predominance of traditional written examinations that measure factual recall rather than analytical thinking, creativity, communication, or collaborative problem-solving. According to P13 (Social Sciences): "Our evaluation is based on memorisation. Students focus on what is in the exam, so developing more skills becomes less important to them." Similarly, P1 (Natural Sciences) reflected: "Students like project work and collaborative activities, but their first question is always whether these tasks are included in the final examination."

These findings demonstrate that instructors perceived a clear misalignment between curriculum objectives that promote competency development and assessment practices that continue to privilege knowledge reproduction. Participants, therefore, argued that meaningful integration of 21st-century skills requires assessment reform alongside curriculum redesign.

4.2.3 Limited Professional Development and Institutional Support

The third subtheme focused on instructors' preparedness. Although participants strongly supported integrating 21st-century skills, many felt insufficiently equipped to translate policy expectations into effective classroom practice. Most participants reported participating in professional development activities; however, they considered these initiatives too general to address the specific pedagogical demands of their disciplines. As P8

(Engineering) insisted: "Most trainings focus on general teaching strategies, but not on how engineering students develop problem-solving or design thinking. I think practical workshops would be much more useful." The majority of participants emphasized the importance of discipline-specific professional development that connects educational principles to authentic classroom practice. In addition to concerns regarding training quality, instructors highlighted the absence of sustained institutional support.

Professional development was frequently described as consisting of isolated workshops with little opportunity for follow-up or mentoring. As P18 (Letters and Languages) explained: "Training usually takes the form of a single workshop. Afterwards there is little follow-up, no mentoring, and very few opportunities to exchange experiences with colleagues." Several participants suggested that continuous professional learning, mentoring, and institutional recognition of innovative teaching would provide more effective support than occasional training events.

Overall, the findings indicate that instructors viewed barriers to integrating 21st-century skills as multidimensional and mutually reinforcing. Structural constraints limited opportunities for active learning; curriculum overload reduced pedagogical flexibility; assessment practices prioritised knowledge reproduction over competency development; and limited professional development constrained instructors' confidence in implementing innovative approaches. Rather than attributing these challenges solely to individual teachers, participants consistently located them within broader institutional structures that shape teaching and learning.

4.3 Perceived Opportunities for Integrating 21st-Century Skills

Despite the challenges identified in the previous section, participants also recognised several opportunities to facilitate the integration of 21st-century skills into Algerian higher education. These opportunities emerged from recent educational reforms, technological developments, and evolving teaching practices. However, participants generally viewed these developments as enabling conditions rather than complete solutions. Their responses suggest that while these opportunities have considerable potential, their successful implementation depends on sustained institutional support, appropriate infrastructure, and equitable access for both instructors and students. Three interrelated subthemes emerged from the analysis:

4.3.1 English Medium Instruction (EMI)

Participants identified the recent expansion of English Medium Instruction (EMI) as one of the most significant developments influencing higher education in Algeria. Across several disciplines, instructors believed that teaching through English has increased access to international scholarship, encouraged broader engagement with global academic communities, and created opportunities to develop several 21st-century competencies, particularly communication, critical thinking, and intercultural awareness. According to P6 (Engineering), "Teaching in English encourages both instructors and students to engage with the international research world. This can expose them to the actual developments in the field." Several participants argued that access to international literature encouraged students to compare perspectives, evaluate evidence from diverse sources, and become more independent learners. However, participants also acknowledged that the benefits of EMI were not experienced equally by all students. Limited English language proficiency was frequently identified as a factor that constrained participation and reduced students' confidence during classroom interaction. These findings suggest that participants viewed EMI as an important opportunity to develop global competencies while recognising that its effectiveness depends on adequate linguistic support and inclusive teaching strategies.

4.3.2 Digital Platforms and Post-Pandemic Pedagogical Developments

The COVID-19 pandemic was widely recognised as a turning point in participants' teaching practices. Although the rapid transition to online instruction initially presented considerable challenges, many instructors believed that it accelerated the adoption of digital technologies and encouraged experimentation with new pedagogical approaches. Several participants reported that both instructors and students became more confident in using digital technologies following the pandemic. As P19 (Letters and Languages) explained, "The pandemic forced us to become more familiar with digital technologies. Although the transition was difficult, it provided valuable experience that we continue to build upon today." Nevertheless, participants emphasised that acquiring basic technological competence should not be confused with the effective pedagogical integration of digital tools. According to P16 (Social Sciences), "it is comfortable using online platforms, but there is a difference between using technology and designing meaningful learning experiences through technology." This distinction was echoed by several instructors, who argued that future professional development should focus not only on technical skills but also on pedagogical approaches that promote collaboration, critical thinking, and student engagement.

Participants also described several teaching practices introduced during online learning that they had continued to use after returning to face-to-face instruction. Discussion forums, online quizzes, collaborative digital platforms, and blended learning activities were frequently cited as examples of successful integration. P12 (Business and Economics) noted, "Working with students online showed me the value of collaborative learning. Although it is more difficult to organise in large face-to-face classes, the experience changed how I think about classroom interaction." These findings suggest that the pandemic encouraged instructors to reconsider traditional teaching practices and introduced pedagogical approaches that many continue to adapt within conventional classroom settings.

4.3.3 Open Educational Resources and Entrepreneurship Initiatives

Participants also identified the growing availability of Open Educational Resources and entrepreneurship programmes as valuable opportunities for promoting 21st-century skills. Many instructors believed that freely accessible digital resources provide students with greater opportunities for independent learning, information literacy, and self-directed knowledge acquisition. As P11 (Business and Economics) explained, "Open educational resources give students entree to materials that were not available before. They encourage students to search for information alone." However, participants also recognised that unequal access to digital technologies continues to limit the potential benefits of these resources. According to P5 (Engineering), "The resources themselves are available, but some students still struggle with internet access or suitable devices." This observation highlights that the educational value of digital resources depends not only on their availability but also on students' ability to access and use them effectively.

Entrepreneurship programmes were identified as another important opportunity for developing multiple competencies simultaneously. Participants viewed these initiatives as authentic learning environments where students could apply theoretical knowledge while strengthening communication, teamwork, creativity, leadership, and problem-solving skills. As P9 (Business and Economics) explained, "Entrepreneurship projects help students to work collaboratively, develop innovative ideas, present solutions, and solve real-world problems." Most of the Participants argued that broader institutional support is needed to ensure that opportunities for experiential and competency-based learning become available across the university rather than remaining confined to selected programmes.

All in all, participants identified several promising opportunities to strengthen the integration of 21st-century skills in Algerian higher education. English Medium Instruction, increased use of digital technologies, Open Educational Resources, and entrepreneurship initiatives were seen as important developments that can enhance communication, critical thinking, collaboration, creativity, and digital literacy. However, instructors consistently emphasized that these opportunities are most effective when paired with appropriate institutional support, equitable access to resources, and sustained pedagogical development.

5. Discussion

This study explored Algerian higher education instructors' perceptions of integrating 21st-century skills into university teaching. The findings indicate that although instructors strongly value these skills, their successful implementation remains constrained by institutional, pedagogical, and infrastructural factors. Overall, the results suggest that integrating 21st-century skills requires a holistic institutional approach rather than isolated classroom initiatives.

The first research question examined how Algerian university instructors conceptualize 21st-century skills. The findings revealed that participants unanimously considered critical thinking, communication, collaboration, creativity, and digital literacy essential for preparing graduates for contemporary labour markets. However, their understanding of these competencies varied according to disciplinary traditions. Engineering and science instructors primarily associated critical thinking with analytical reasoning and problem solving, whereas humanities instructors emphasized interpretation, reflection, and critical inquiry. These findings support international literature suggesting that although major frameworks such as P21, ATC21S, and the OECD Learning Framework identify common competencies, their interpretation is shaped by disciplinary contexts (Binkley et al., 2012; Dede, 2010; Voogt & Roblin, 2012). Similarly, Chalkiadaki (2018) argues that 21st-century skills cannot be understood in isolation from educational contexts, while González-Pérez and Ramírez-Montoya (2022) conclude that competency frameworks share common principles despite differences in implementation. Unlike previous Algerian studies that focused mainly on digital competence or English language education (Ghobrini, 2020; Mehdaoui & Benabed, 2022; Amarouche & Bilouk, 2025; Bahloul & Mouas, 2025), this study demonstrates that disciplinary epistemologies significantly influence how instructors understand and prioritize these competencies.

The second research question investigated the barriers that hinder the integration of 21st-century skills. Participants consistently identified overcrowded classrooms, inadequate digital infrastructure, rigid curricula, examination-oriented assessment, and insufficient professional development as the principal challenges. These findings closely correspond with previous international research demonstrating that competency-based education is frequently constrained by institutional conditions rather than by instructors' willingness to innovate ((Joynes et al., 2019; Voogt & Roblin, 2012; Schleicher, 2012; Binkley et al., 2012; Lai & Viering, 2012; Anagün et al., 2016). Within the Algerian context, the results corroborate those of Ghobrini (2020), Mehdaoui and Benabed (2022), Boulmerka (2026), and Bahloul and Mouas (2025), who similarly reported that limited institutional support, inadequate technological resources, and insufficient pedagogical training continue to restrict the implementation of learner-centred teaching. These findings suggest that improving instructors' awareness alone is insufficient unless supported by systemic institutional reform.

The third research question explored opportunities to promote 21st-century skills in Algerian higher education. Participants viewed English Medium Instruction, digital technologies, Open Educational Resources, and entrepreneurship initiatives as promising

avenues for developing communication, collaboration, creativity, critical thinking, and digital competence. These findings support previous studies showing that learner-centred pedagogies, authentic learning environments, and technology-enhanced instruction contribute significantly to competency development (Redecker, 2017; González-Pérez & Ramírez-Montoya, 2022). Likewise, the positive role attributed to collaborative learning and authentic projects is consistent with recent evidence highlighting the effectiveness of collaborative pedagogies and entrepreneurship education in fostering transferable skills (Bell, 2010; Hmelo-Silver, 2004). Nevertheless, participants emphasized that these opportunities can only be fully realized when accompanied by adequate infrastructure, curriculum flexibility, and sustained professional development, reinforcing the view that educational innovation depends on coherent institutional ecosystems rather than technological adoption alone.

Overall, the findings demonstrate that integrating 21st-century skills extends beyond curriculum reform and requires alignment among educational policy, pedagogy, assessment, digital infrastructure, and continuous professional learning. Such alignment is essential if Algerian universities are to prepare graduates equipped with the competencies required for lifelong learning, employability, and participation in an increasingly knowledge-based global society.

6. Recommendations and Pedagogical Implications

The findings of this study suggest that the successful integration of 21st-century skills in Algerian higher education requires coordinated institutional rather than isolated pedagogical interventions. First, universities should strengthen the learning environment by investing in teaching infrastructure, including reducing class sizes where feasible, redesigning classroom spaces to facilitate collaborative learning, and improving access to reliable digital technologies and internet connectivity. Such improvements would provide instructors with the conditions necessary to implement active and student-centred pedagogies.

Curriculum and assessment reform should constitute a parallel priority. Existing programmes should be reviewed to reduce content overload and create greater opportunities for inquiry-based learning, interdisciplinary projects, and authentic problem-solving activities. Likewise, assessment practices need to evolve beyond traditional examinations by incorporating portfolios, project-based assessment, peer assessment, and performance tasks that more accurately evaluate higher-order competencies such as critical thinking, collaboration, creativity, and communication.

The study also highlights the importance of sustained professional development. Universities should provide discipline-specific training programmes that enable instructors to translate competency-based approaches into their respective disciplinary contexts. Rather than relying on isolated workshops, institutions should establish communities of practice through which instructors can exchange experiences, observe innovative teaching practices, and collaboratively develop learning resources. Such collaborative professional learning is likely to foster greater pedagogical confidence and encourage the sustainable adoption of learner-centred approaches.

Finally, institutional policies should capitalise on emerging opportunities identified by instructors. Expanding entrepreneurship initiatives, increasing the use of Open Educational Resources, strengthening industry partnerships, and supporting the pedagogically meaningful integration of digital technologies can create authentic learning environments that simultaneously promote multiple 21st-century competencies. However, these initiatives should be accompanied by coherent institutional policies that align curriculum, assessment, professional development, and resource allocation. Without such alignment, expectations for competency-based teaching are unlikely to translate into consistent classroom practice.

7. Limitations

The current study has several methodological limitations. First, it relied exclusively on an online qualitative questionnaire, which did not allow follow-up or clarification of participants' responses, as would have been possible with semi-structured interviews. Second, the findings are based on instructors' self-reported perceptions rather than direct observations of classroom practice or analysis of instructional documents. Third, the research sample was relatively small, comprising 20 instructors from two universities in Sétif, which may limit the transferability of the findings to other Algerian higher education institutions or disciplinary contexts. Consequently, the study offers insight into participants' interpretations rather than objective measures of pedagogical behavior.

8. Conclusion

This study offers genuine insights into the perspectives of a key yet understudied group in the Algerian higher education modernization process: instructors. The findings of this study demonstrate that the successful integration of 21st-century skills in Algerian higher education depends not only on instructors' awareness and willingness to adopt innovative pedagogies but also on the institutional conditions that enable such practices. While participants exhibited a clear understanding of the value of the 4Cs and expressed strong commitment to preparing students for contemporary academic and professional demands, their efforts remain constrained by limited infrastructure, rigid curricula, insufficient professional development opportunities, and inadequate institutional support. These findings highlight a persistent gap between educational aspirations and implementation realities, suggesting that meaningful pedagogical transformation requires systemic rather than individual change.

The study, therefore, underscores the need for higher education institutions to adopt a holistic approach that aligns educational policies, curriculum design, teacher professional development, digital infrastructure, and assessment practices with the competencies demanded by the twenty-first century. Empowering instructors through sustained institutional investment and greater pedagogical autonomy is essential for translating policy objectives into effective classroom practice and fostering a culture of innovation in teaching and learning.

Future research should extend this work by investigating the implementation of 21st-century skills across a wider range of academic disciplines and higher education institutions using larger and more diverse samples. Comparative studies involving public and private institutions, as well as cross-national research within comparable educational contexts, would provide deeper insights into the contextual factors that facilitate or hinder successful implementation. Moreover, longitudinal studies are also needed to examine how institutional reforms, curriculum innovations, and sustained professional development initiatives shape instructors' pedagogical practices over time. Furthermore, future investigations could adopt mixed-methods or multiple-case study designs that integrate qualitative interviews, classroom observations, curriculum document analysis, and large-scale survey data to enhance methodological rigor through data triangulation. Finally, incorporating students' perspectives alongside instructors' experiences would provide a more holistic understanding of how 21st-century skills are enacted in higher education and how these practices influence students' learning experiences, competency development, and readiness for the demands of the twenty-first century.

Declaration on Generative AI Use. This document has benefited from the use of AI-powered tools, including Grammarly, QuillBot, and Zotero, for language refinement, grammar correction, and structural organization. AI was not employed to generate original research content, conduct data analysis, or interpret findings. This statement confirms that all

research outcomes remain the result of human inquiry. The author assumes full responsibility for the final content, ensuring its integrity and originality.

Ethical Declaration. The study adhered to established ethical principles for educational research. Participation was voluntary, and all participants provided informed consent before data collection. All data collected were used exclusively for academic research purposes and were handled in accordance with principles of confidentiality and responsible research practice.

Funding Statement. The author received no financial support for the research, authorship, or publication of this article.

Conflict of Interest. The author declares that she has no conflicts of interest that could have influenced the research, its findings, or the publication of this study.

Data Availability Statement. Data are available upon request.

Author Contribution. The author solely conceived and designed the study, reviewed the related literature, developed the research instruments, collected and analyzed the data, interpreted the findings, revised the manuscript, and approved the final version for publication. The author accepts full responsibility for the accuracy, integrity, and originality of the work.

References

Amarouche, F., & Bilouk, L. (2025). The relationship between EFL teachers' digital literacy practices and their informal professional development in Algerian higher education. *Revue algérienne des lettres, 9*(2), 294–306. https://asjp.cerist.dz/en/article/284237

American Association of Colleges for Teacher Education. (2010). *21st century knowledge and skills in educator preparation*. https://www.aacte.org

Anagün, Ş. S., Atalay, N., Kılıç, Z., & Yaşar, S. (2016). The Development of a 21st Century Skills and Competences Scale Directed at Teaching Candidates: Validity and Reliability Study. *Pamukkale University Journal of Education, 40*, 160–175. https://dergipark.org.tr/tr/download/article-file/399416

Assessment and Teaching of 21st Century Skills. (2010). *Assessment and teaching of 21st century skills*. http://www.atc21s.org

Azzi, M., & Mebarki, Z. (2025). Pedagogical innovations within the LMD reform in Algeria: Shifting from teacher-centeredness to learner-centeredness in EFL teachers' practices. *Journal of Studies in Language, Culture and Society, 8*(4), 49–68. https://asjp.cerist.dz/en/article/286500

Bahloul, A., & Mouas, S. (2025). A study of Algerian university teachers' digital competencies in the era of 21st century skills: The mediating role of digital resources on professional engagement, teaching and learning. *Akofena, 15*(1), 17–32. https://www.revueakofena.com/wp-content/uploads/2025/02/02-M15V01-08-Amel-BAHLOUL-Samia-MOUAS_017-032.pdf

Bell, S. (2010). Project-based learning for the 21st century: Skills for the future. *The Clearing House: A Journal of Educational Strategies, Issues and Ideas, 83*(2), 39–43. https://doi.org/10.1080/00098650903505415

Binkley, M., Erstad, O., Herman, J., Raizen, S., Ripley, M., Miller-Ricci, M., & Rumble, M. (2012). Defining twenty-first century skills. In P. Griffin, B. McGaw, & E. Care (Eds.), *Assessment and teaching of 21st century skills* (pp. 17–66). Springer.

Boulmerka, S. (2026). Implementing 21st century skills in EFL classrooms: ENS teachers' attitudes toward pedagogical practices of the 4C skills. *El Mi'yar, 30*(3), 122–133. https://asjp.cerist.dz/en/article/296682

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology, 3*(2), 77–101. https://doi.org/10.1191/1478088706qp063oa

Braun, V., & Clarke, V. (2019). Reflecting on reflexive thematic analysis. *Qualitative Research in Sport, Exercise and Health, 11*(4), 589–597. https://doi.org/10.1080/2159676X.2019.1628806

Braun, V., & Clarke, V. (2021). *Thematic analysis: A practical guide*. Sage.

Chalkiadaki, A. (2018). A systematic literature review of 21st century skills and competencies in primary education. *International Journal of Instruction, 11*(3), 1–16. https://doi.org/10.12973/iji.2018.1131a

Creswell, J. W., & Creswell, J. D. (2018). *Research design: Qualitative, quantitative, and mixed methods approaches* (5th ed.). Sage.

Creswell, J. W., & Poth, C. N. (2018). *Qualitative inquiry and research design: Choosing among five approaches* (4th ed.). Sage.

Dede, C. (2010). Comparing frameworks for 21st century skills. In J. Bellanca, & R. Brandt (Eds.), *21st century skills: Rethinking how students learn* (pp. 51–76). Solution Tree Press.

Ghobrini, R. E. A. (2020). Sharpening students' 21st century skills through project-based learning in an EFL context at Abdelhamid Ibn Badis University, Algeria. *Journal of Studies in Language, Culture and Society, 3*(1), 102–112. https://asjp.cerist.dz/en/article/125434

González-Pérez, L. I., & Ramírez-Montoya, M. S. (2022). Components of Education 4.0 in 21st century skills frameworks: Systematic review. *Sustainability, 14*, Article 1493. https://doi.org/10.3390/su14031493

Herrington, J., & Oliver, R. (2000). An instructional design framework for authentic learning environments. *Educational Technology Research and Development, 48*(3), 23–48. https://doi.org/10.1007/BF02319856

Hmelo-Silver, C. E. (2004). Problem-based learning: What and how do students learn? *Educational Psychology Review, 16*(3), 235–266. https://doi.org/10.1023/B:EDPR.0000034022.16470.f3

Jansen, H. (2010). *The logic of qualitative survey research and its position in the field of social research methods.* Forum Qualitative Sozialforschung / Forum: Qualitative Social Research, 11(2), Art. 11. https://doi.org/10.17169/fqs-11.2.1450

Joynes, C., Rossignoli, S., & Amonoo-Kuofi, E. F. (2019). *21st century skills: Evidence of issues in definition, demand and delivery for development contexts* (K4D Helpdesk Report). Institute of Development Studies. https://opendocs.ids.ac.uk/opendocs/handle/20.500.12413/14148

Lai, E. R., & Viering, M. (2012). *Assessing 21st century skills: Integrating research findings*. National Council on Measurement in Education.

Mahmud, M. M., & Wong, S. F. (2022). Digital age: The importance of 21st century skills among the undergraduates. *Frontiers in Education, 7*, Article 950553. https://doi.org/10.3389/feduc.2022.950553

Mehdaoui, A., & Benabed, A. (2022). Gauging Algerian EFL teachers' awareness of the 21st century compulsory skills: Case of EFL teachers at Ibn Khaldoun University of Tiaret. *Technium Social Sciences Journal, 33*, 115–131. https://doi.org/10.47577/tssj.v33i1.6917

Merriam, S. B., & Tisdell, E. J. (2016). *Qualitative research: A guide to design and implementation* (4th ed.). Jossey-Bass.

Miliani, M. (2017). La réforme LMD: Un problème d'implémentation. *Insaniyat: Revue Algérienne d'Anthropologie et de Sciences Sociales, 21*(75–76), 129–148. https://asjp.cerist.dz/en/article/232782

National Education Association. (2012). *Preparing 21st century students for a global society: An educator's guide to the Four Cs*. https://www.nea.org/sites/default/files/2020-07/A-Guide-to-Four-Cs.pdf

OECD. (2019). *OECD Learning Compass 2030: A series of concept notes*. OECD Publishing.

Patton, M. Q. (2015). *Qualitative research & evaluation methods* (4th ed.). Sage.

Redecker, C. (2017). *European framework for the digital competence of educators: DigCompEdu*. Publications Office of the European Union.

Silva, E. (2009). Measuring skills for 21st century learning. *Phi Delta Kappan, 90*(9), 630–634. https://doi.org/10.1177/003172170909000905

Trilling, B., & Fadel, C. (2009). *21st century skills: Learning for life in our times*. Jossey-Bass.

Voogt, J., & Roblin, N. P. (2012). A comparative analysis of international frameworks for 21st century competences: Implications for national curriculum policies. *Journal of Curriculum Studies, 44*(3), 299–321. https://doi.org/10.1080/00220272.2012.668938