



EFFECT OF DIGITAL COMPETENCIES ON CAREER CHOICE OF UNDERGRADUATE STUDENTS

¹ Summiya Batool

MPhil Scholar, National College of Business Administration & Economics (NCBA&E)
(Alhamra University) Lahore, Punjab-Pakistan

summyiahasnain85@gmail.com

² Haq Nawaz, PhD

Associate Professor, Department of Education National College of Business Administration
& Economics (NCBA&E) (Alhamra University) Lahore, Punjab-Pakistan

drhaqnawaz@ncbae.edu.pk (Corresponding Author)*

Abstract

The rapid integration of digital technologies into academic, professional, and social domains has transformed the skill requirements of modern careers. The current study employed a quantitative correlational survey design. The primary objective of the study was to explore the impact of digital competencies on the career choices of undergraduate students, probing how students' proficiency in digital skills affects their career aspirations, decision-making processes, and readiness for emerging job markets. The sample of the study consisted of 300 undergraduate students selected from universities in Lahore through a simple random sampling technique. The digital competencies and career choice tools were used to collect data from students to explore the phenomenon. The digital competencies tool comprises five dimensions: information literacy, communication and collaboration, digital content creation, safety, and problem solving with twenty seven-items, and the career choice tool contained four dimensions: ease of subject, interest in subject, future job opportunities, and financial outcomes with twenty three-items. The content validity of the instruments was ensured with five educational experts. The reliability of digital competencies and career choice was calculated by applying Cronbach's Alpha scores of .940 and .927, respectively. The calculated data were analyzed employing means, standard deviation, Pearson correlation, and regression analysis techniques to explore the phenomenon. The findings of the study showed a moderate relation between digital competencies and career choice. Moreover, the findings showed a positive and significant consequence of digital competencies on the career choice of undergraduate students. The study concluded that strengthening digital skills within higher education helps in career decisions to meet the demands of the digital economy. On the basis of the results of the study, it was recommended that policymakers, educational leaders, and faculty personnel play their role in the curriculum enhancement, career counseling, and institutional support to align digital competencies and career choice of undergraduate students.

Keywords: Career choice, digital competencies, undergraduate students.

Introduction

Digital competencies have emerged as an essential determinant of students' academic, professional, and career trajectories in a contemporary knowledge-based and technology-driven economy. Digital competencies and career choice are imperative for students in today's technology-driven world. Digital tools shape learning, communication, and future job opportunities. Students develop the skills needed to navigate education and the workplace (Anwar, Rahman, & Sulaiman, 2023; Carretero, Vuorikari, & Punie, 2017; Falloon, 2020). Competence refers to the holistic ability of an individual to perform a task in a professional context effectively. Competencies are *what a person knows, can do, and how behaves* while performing specific tasks. Digital competencies contain digital literacy, information management, communication, collaboration, problem-solving using technology, and digital resources. Competence is the combination of knowledge, skills, attitudes, and personal traits that enable effective performance, while competencies are specific, measurable abilities that help individuals function successfully (El Asame & Wakrim, 2018; Leekitchwatana, 2017).



Digital competencies need knowledge, skills, and attitudes to use digital technologies for learning, communication, and problem solving (European Commission, 2019; Falloon, 2020). Key dimensions of digital competencies include information and data literacy, communication and collaboration, digital content creation, safety, and problem solving (Tzafilkou et al., 2022; Vuorikari et al., 2022). It is important to assess students' digital abilities to support effective learning in a technology-based education (Camelo et al., 2018; Xu et al., 2022).

Digital competence plays a strong role in shaping students' career development. Many modern careers rely on digital tools, data handling, online communication, and technology-supported work processes (Anwar et al., 2023; Gao, 2024). Students with stronger digital skills feel more confident in exploring emerging job opportunities and adapting to the changing work environment (Puspitadewi & Umamy, 2024; Scott, 2024). Career choice is influenced by interest in the subject, ease of understanding, job prospects, and financial expectations (Herr, 2001). Digitalization and artificial intelligence in a rapidly changing job market, shaped by digital readiness has become necessary for successful transitions from university to work (Zhang, Wang, & Li, 2022; Oliva et al., 2024). Career choice is a complex process for students that is influenced by personal interests, family expectations, peer pressure, socioeconomic background, labor market trends, institutional support, and teachers' guidance (Brown, 2002; Koivisto, Vinokur, & Vuori, 2011). Some students choose careers according to their passion, while others are compelled by parents or social preferences to select a career. This makes career decision-making a challenging process that required students understand their strengths, competencies, and long-term career choice (Vazirani, 2010).

Students with higher digital fluency tend to perform better academically, explore career options more actively, and show greater adaptability to a new learning environment (Anwar, Rahman, & Sulaiman, 2023; Zhao et al., 2021). Studies suggested that digital literacy helps students to understand academic material, evaluate job opportunities, and utilize online learning resources (Carretero, Gomez, Vuorikari, & Punie, 2017;). With the expansion of digital learning in higher education, institutions ensured that students develop the abilities needed to make informed career decisions (European Commission, 2016; Falloon, 2020). The rapid advancements in technologies significantly transformed the nature of work, employment patterns, and career opportunities worldwide in the contemporary digital era. Digital competencies influence the career choices of undergraduate students and offer insights to support educational planning and student development (Puspitadewi & Umamy, 2024; Scott, 2024). Previous studies reported that digital competence improves academic performance, motivation, and long-term career readiness (Duncan-Howell, 2012; Nemeskeri, Szello, Zadori, & Barakonyi, 2016).

Despite growing recognition of digital competencies in the 21st-century workforce, several gaps exist regarding a lack of contextual understanding, limited focus on perceptions and decision-making processes, insufficient integration of career guidance, labor market demands, industry expectations, employability outcomes, and socio-economic background that have a direct influence on undergraduate students' career choices. There is a need for designing a study to explore how digital competencies shape career trajectories that may guide policymakers, teachers, and career counselors to better support students in the digital age. The primary objective of the study is to support educational planning and career readiness for undergraduate students.

Statement of the Problem

Digital competencies contribute to success in the modern labor market. Technology-driven professionals perform better, though digital literacy fluency. Career choice is a complex



process for professionals; some select careers according to individual interests, labor market trends, socioeconomic background, family pressure, or institutional guidance (Brown, 2002; Koivisto et al., 2011). This makes career decision-making challenging to understand the strengths, competencies, and long-term benefits for students (Vazirani, 2010). Contemporary trends described association between digital competence and career choice. Results of the studies reported that digital literacy helps in academic learning, better job opportunities, and online career choices to the students (Carretero et al., 2017; Cha et al., 2018). Students with higher digital fluency tend to perform better, have more career options, and show greater adaptability to new learning environments (Anwar, Rahman, & Sulaiman, 2023; Zhao et al., 2021). Despite the growing importance of digital competencies, many undergraduate students have diverging levels of digital capacity. This disparity may influence their awareness of emerging career selections, confidence in pursuing technology-driven professions, and ability to align their career choices with labor market demands. Students with strong digital competencies may gravitate toward careers in information technology, digital entrepreneurship, data analysis, and other technology-oriented fields. Others with limited digital exposure may restrict their career to traditional occupations. The existing studies provided vibrant results regarding the association of digital competencies with career choice. The lack of clarity about how digital competencies influence career preferences creates a gap in understanding whether students choose fields based on interest, future job demands, or simply due to limited digital readiness. Despite the growing importance of digital literacy education and the job market, limited studies have been framed in the local context to explain how undergraduate students' digital skills influence their career decisions. Therefore, this study seeks to address this gap through exploring the effect of digital competencies on the career choice of undergraduate students. The current study results may provide evidence to help universities policymakers, administrators, curriculum developers, and teachers in supporting students' digital readiness and career planning.

Significance of the study

This study describes the significance of digital competencies for students' career choice in the technology-driven world. The results of this study are helpful for universities policymakers to provide evidence based guidance in planning and implementation of programs that enhance digital competency, ensure access to digital resources, and reduce the digital divide across educational institutions. The results of this study results are helpful for university administrators and teachers integrating digital skills into the curriculum, learning activities that strengthen digital literacy, and support students in making informed career choices. The results of this study are helpful for students to understand how developing digital competencies enhances their career opportunities, improves decision-making, and aligns their interests with suitable career path. It encourages students to use digital tools for learning, research, and professional development, fostering academic success and future employability. The results of the study contribute to preparing a workforce capable of meeting the demands of the modern job market through promoting digital literacy. Overall, this study emphasized that strengthening digital competencies is essential for informed career planning, professional growth, and successful transitions from higher education to the workplace.

Research objectives

1. To find out the relationship between digital competencies and the career choice of undergraduate students



2. To explore the effect of digital competencies on the career choice of undergraduate students

Literature Review

Literature review of this study deals with digital competencies, their dimensions, and career choice, and previous studies related to digital competencies and career choice of students.

Digital Competencies

Digital competencies are the blend of knowledge, skills, and traits that enable individuals to apply digital devices for learning, communication, and in the workplace. It included computer, laptop, Ipad smartphones, critical thinking, problem-solving, creativity, collaboration, and responsible online behavior. For undergraduate students, developing digital competence is essential to managing information, create content, stay safe online, and adapt to digital learning environments. Key dimensions of digital competencies consisted of information and data literacy, communication and collaboration, digital content creation, safety, and problem solving (Tzafilkou et al., 2022; Van Dijk, 2020; Vuorikari et al., 2022)

Information and Data Literacy: Information and data literacy refers to the ability to locate, use, and evaluate information and data effectively for problem-solving, decision-making, and academic or professional purposes. Students with strong information and data literacy can critically assess the credibility of sources, interpret complex datasets, and integrate accurate information to support informed educational and career choices. This competency combines traditional digital literacy with analytical and critical thinking skills, enabling students to navigate the vast and sometimes misleading information available in the digital age (Vazirani, 2010). Undergraduates who analyze labor market trends, evaluate online career resources, and interpret relevant data are better equipped to make strategic career decisions that align with their skills and interests (Anwar, Rahman, & Sulaiman, 2023).

Communication and Collaboration: Communication and collaboration are the ability to interact, share ideas, and work jointly with others to achieve academic and professional goals. These skills, extended from online platforms and collaborative tools, allow students to engage in virtual teamwork, to co-create content, and complete tasks efficiently in the digital era. Students proficient in digital communication and collaboration can articulate ideas clearly, provide constructive feedback, and coordinate responsibilities, enhancing learning outcomes and problem-solving abilities. Tools such as Microsoft Teams, Google Workspace, and discussion forums facilitate teamwork, peer learning, and knowledge sharing across diverse environments (López-Gil & Bernal-Bravo, 2019).

Digital Content Creation

Digital content creation refers to the ability to produce, edit, and share digital content using various technological tools and platforms. This skill requires the integration of knowledge, creativity, and critical thinking to communicate ideas effectively, solve problems, and contribute to professional tasks. Students who are proficient in digital content creation can design multimedia presentations, develop educational or professional materials, create digital portfolios, and engage audiences through interactive platforms. The process of creating digital content not only demonstrates technical competence but also reflects higher-order thinking skills, including application of knowledge, synthesis, and evaluation, which are essential for academic success and career development (Vuorikari et al., 2022; El Asame & Wakrim, 2018).

Digital Safety

Digital safety refers to the ability to protect personal information, maintain privacy, and use digital technologies responsibly in academic, social, and professional contexts. Students who



are digitally safe understand cybersecurity principles, recognize online risks such as phishing, malware, and identity theft, and apply strategies to safeguard their data and devices. Awareness and practice of digital safety not only prevent personal and professional harm but also build students' confidence in engaging with technology for learning, research, and career development. Students who constantly use secure passwords, enable two-factor authentication, and verify the credibility of online platforms are better equipped to navigate educational and professional digital environments safely (Vuorikari et al., 2022; Zhao et al., 2021).

Problem Solving: Problem-solving is the ability to identify challenges, analyze information, and develop effective solutions using digital resources and tools. Students who have skill in problem solving use technology to search situations, test hypotheses, and make informed decisions in a digital literacy context. This ability enables learners to navigate complex academic tasks, manage projects efficiently, and apply critical thinking to real-world problems (Vuorikari et al., 2022). Students use data analysis software to interpret trends, digital simulations to explore outcomes, or collaborative platforms to design solutions for group projects that enhance analytical and practical reasoning skills (Anwar, Rahman, & Sulaiman, 2023).

Career Choice: Career choice refers to the process through which individuals identify, evaluate, and select a career path that aligns with their skills, interests, values, and long-term goals. This process is influenced by personal abilities, educational experiences, socio-economic factors, and exposure to relevant career information. Career choice is an important task for professional identity, future employment opportunities, and self-awareness in making informed and realistic career decisions for undergraduate learners (Puspitadewi & Umamy, 2024).

Career choice enables students to explore career options, analyze labor market trends, and assess required skills for various professions. Students with strong digital skills use online career platforms, professional networks, and data-driven resources to plan their career paths strategically and confidently (Vuorikari et al., 2022). Digital capabilities-based decisions lead to higher career satisfaction, adaptability, and long-term professional success. Therefore, integrating digital skills and career guidance within higher education supports students in making choices that ensure future growth and fulfillment.

Dimensions of Career Choice

Career choice is influenced through interrelated dimensions, ease of subject, interest in the subject, job opportunity, and financial outcomes. Students who choose career aligned with subjects enhance motivation, confidence, and long-term commitment as they find it manageable and interesting. Job security and income plays role in shaping career decisions in a competitive labor market. Students' access to information and awareness support career choice for personal satisfaction through economic success (Carretero, Vuorikari, & Punie, 2017).

Ease of Subject: Ease of subject refers to students' perceptions of how difficult the subject is based on their abilities, prior knowledge, and learning experiences. The difficulty of a subject influences career decisions, as students prefer subjects they find easier to understand and perform well in, which enhance confidence and academic motivation. However, studies suggested that challenging subjects aligned with students' strengths, interests, and long-term aspirations lead to greater skill development and more rewarding career outcomes. When students receive proper guidance and support, they are more engaged with demanding subjects that offer strong career prospects, rather than avoiding them solely due to perceived difficulty (Puspitadewi & Umamy, 2024).



Interest in the Subject: Interest in the subject refers to students' intrinsic motivation, curiosity, and personal engagement with a particular field of study. Interest enhances learning through increased attention, consistent willingness, and effort in acquiring deeper knowledge and skills. Learners who are interested in a subject tend to perform better academically and develop a stronger sense of competence, which supports confident and career decision-making. When a career choice is aligned with students' interests and passions, they experienced satisfaction, professional growth, and resilience in the workplace. Interest-driven subjects' choice encourages lifelong learning, enabling students to remain motivated and successful in a dynamic career environment (Anwar, Rahman, & Sulaiman, 2023).

Job Opportunity: Job opportunity refers to the availability, accessibility, and sustainability of employment options within a particular field. It contributes to students' career choices. Students evaluate career paths based on labor market demand, job opportunities, and availability of professional development. Disciplines that offer stable employment and a clear growth path tend to attract more students, mostly where economic benefits are high. Access to accurate labor market information, career guidance, supports students in understanding industry requirements, and aligns their skills with market needs. Such support is crucial for students from disadvantaged backgrounds, as it helps bridge information gaps, builds confidence, overcomes structural barriers, and enables them to make informed career decisions (Gao, 2024; El Asame & Wakrim, 2018).

Financial Outcomes: Financial outcomes refer to the expected economic benefits associated with a particular career, including income level, job stability, and long-term financial security. Financial considerations significantly influence students' career choices, as many undergraduates prioritize careers with higher earning potential, personal interest, and stable employment prospects. Students' economic backgrounds contribute to subject selection, as those from lower-income families may avoid costly or lengthy courses due to financial constraints and uncertainty about returns on investment. Financial aid opportunities reduce barriers and encourage students to pursue fields aligned with their abilities and career aspirations. Students' awareness of financial outcomes with career guidance enables them to make balanced career decisions consider economic sustainability and personal fulfillment (Puspitadewi & Umamy, 2024).

Previous Studies Related to Effect of Digital Competencies on Career Choice of Undergraduate Students

A study was framed by Zhang et al. (2022) to explore the role of digital education in the development of students' skills and employability in China. The study was a quantitative correlational study based on a survey design. A sample of 155 college students was selected through a simple random sampling technique. The collected data were analyzed employing Correlation and regression to explore the relationship and effect of digital education and students' career-outcomes. The results of the study revealed a significant positive effect of digital education on students' career choice. The results indicated that digital skills enhance employability and support career decision-making.

Another study was framed by Oliva et al. (2024) to explore the role of digital education in the development of students' skills and employability in Spain. The study was a quantitative correlational study based on a survey design. A sample of 392 undergraduate students was selected through a simple random sampling technique. Pearson correlation and regression analysis were applied to explore the relationship between digital education and employability. The results of the study revealed a positive and statistically significant relationship between



digital competencies and career choice, indicating that higher levels of digital skills enhance students' employability and support informed career decision-making.

A study was framed by Gao (2024) to analyze the relationship between digital literacy and employability in China. The study was quantitative, based on a survey design. A sample of 577 undergraduate students was selected through a simple random sampling technique. Structural equation modeling (SEM) was applied to analyze the data. The results of the study revealed that digital literacy significantly predicts employability in career decisions. The results stated that students with stronger digital competencies were better equipped to make career decisions and adapt effectively to workforce requirements.

A study was designed by Scott (2024) to analyze how digital literacy influences career readiness in the United States. The study was quantitative, based on a survey design. Multiple regression analysis was applied to determine the influence of digital literacy on career preparedness. The results of the study revealed that students perceive digital literacy as essential for entering the workforce, securing employment, performing job-related tasks, and advancing in their careers through digital skills readiness.

A study was structured by Anwar et al. (2023) to explore the effect of academic digital literacy on career adaptation among undergraduate graduates in Pakistan. The study was quantitative, based on a survey design. Regression analysis was applied to analyze the relationship between digital literacy and career adaptability. The results indicated that higher digital competencies significantly enhance graduates' career adaptability, enabling them to respond effectively to labor market demands and improve their career prospects.

Overall, these studies collectively demonstrated that digital competencies play an important role in selecting a career among undergraduate students. Students equipped with strong digital skills are more likely to make better career decisions focusing on professional requirements in competitive job markets.

Research Methodology

The current study was a quantitative correlational study based on a survey design. A sample of 300 undergraduate university students was selected through a simple random sampling technique from Lahore. A self-constructed questionnaire was used to collect the data from respondents. Content validity of the questionnaire was ensured through a panel of experts. The experts evaluated the clarity, relevance, and adequacy of each item. The pilot study was framed to identify potential issues in the questionnaire and ensure the reliability of the instrument before large-scale data collection (Seale, 2011). The ethical considerations were ensured of participants prior to data collection. Researchers' personality visited the selected universities to collect the data from students. Reliability of digital competencies and career choice tool was calculated employing Cronbach's Alpha score .940 and .927, respectively.

Data Analysis and Interpretation

The collected data were entered into excel sheet, then transport to the Statistical Package for Social Sciences (SPSS) to analyze the data according to the study objectives. Descriptive statistics mean, standard deviation, and inferential statistics, Pearson correlation, and multiple regression analysis were applied to explore digital competencies and career choice of students.

Table 1

| Relationship between the dimensions of digital competencies and career choice | | | | | | |
|---|---|---|---|---|---|---|
| Variables | 1 | 2 | 3 | 4 | 5 | 6 |
| Information and Literacy | - | | | | | |



| | | | | | | |
|---------------------------------|--------|--------|--------|--------|--------|---|
| Communication and Collaboration | .389** | - | | | | |
| Digital Content Creation | .394** | .419** | - | | | |
| Safety | .381** | .352** | .433** | - | | |
| Problem Solving | .341** | .228** | .311** | .341** | - | |
| Career Choice | .376** | .333** | .372** | .352** | .329** | - |

** Correlation is significant at the 0.01 level (2-tailed)

Table 1 demonstrates Pearson correlation association between the dimensions of digital competencies and career choice. The results showed a moderate association across factors of digital competencies with career choice, evidenced by the correlation coefficients .376, .333, .372, .352, and .329 respectively. These values claimed a consistent, strong relationship, highlighting the influence of the dimensions of digital competencies on career choice.

Table 2

Relationship between digital competencies and career choice

| Variables | 1 | 2 |
|----------------------|--------|---|
| Digital Competencies | - | |
| Career Choice | .411** | - |

** Correlation is significant at the 0.01 level (2-tailed)

Table 2 showed the correlation between digital competencies and career choice; Pearson Correlation was utilized. The findings of the study indicated a strong relationship between digital competencies and career choice of students with r value .411.

Table 3

Effect of dimensions of digital competencies on career choice

| DV | Constructs | S.E | B | t | p |
|---------------|---------------------------------|------|------|------|------|
| Career Choice | (Constant) | | | | |
| | Information and Literacy | .092 | .482 | 5.23 | .00* |
| | Communication and Collaboration | .081 | .351 | 4.31 | .02* |
| | Digital Content Creation | .016 | .381 | 2.33 | .02* |
| | Safety | .127 | .365 | 2.87 | .04* |
| | Problem Solving | .150 | .333 | 2.21 | .01* |

Table 3 demonstrated the effect of dimensions of digital competencies on the career choice of learners. The results of regression analysis showed that the dimensions of digital competencies has moderate consequences on career choice with beta values .482, .351, .381, .365 and .333, respectively.

Table 4

Effect of digital competencies on career choice

| DV | Constructs | S.E | B | t | p |
|---------------|----------------------|------|------|------|------|
| Career Choice | (Constant) | | | | |
| | Digital Competencies | .093 | .382 | 3.39 | .00* |

Dependent Variable: CC



Table 4 showed the effect of digital competencies on career choice of students, results of regression analysis indicated that digital competencies has moderate influence on career choice with a beta value of .382.

Results

The results of the study revealed that undergraduate students were moderately satisfied with the digital competencies dimensions: information and data literacy, communication and collaboration, digital content creation, digital safety, and problem-solving. Similarly, career choice dimensions, ease of subject, interest in the subject, job opportunities, and financial outcomes were reported as moderately satisfied by the respondents. Pearson correlation analysis reported a moderate positive relationship between dimensions of digital competencies and career choice, with correlation coefficients ranging from .329 to .376 for individual dimensions and .411 for overall digital competencies. Regression analysis further indicated that dimensions of digital competencies had a moderate effect on career choice, with beta values ranging from .333 to .482, confirming that digital competencies significantly influence undergraduate students' career decisions.

Discussion

The current study was framed to analyze the effect of digital competencies on the career choices of undergraduate students. The results revealed a moderate relationship between digital competencies and career choice, with a positive and significant influence of digital competencies on students' career decisions. Students who demonstrated higher levels of skills in information handling, online collaboration, digital communication, problem-solving, and digital content creation were more likely to choose technology-oriented and innovation-driven careers. Moreover, institutional support, including technology-based activities, workshops, and practical training, further strengthened the alignment between students' digital competencies and their career aspirations, highlighting the importance of digital readiness in career decision-making. These findings were consistent with a previous study of Zhang et al. (2022), who reported that the development of digital competencies positively influenced students' employability, while Oliva et al. (2024) reported a positive and significant relationship between digital competencies and career choice. Similarly, Gao (2024) declared that digital literacy predicts employability through career-decision, and future-time perspective, and Scott (2024) described that digital competencies enhance students' readiness for workforce tasks. Similarly, Anwar et al. (2023) stated that higher digital competencies improve graduates' career adaptability. The results of these studies supported the present study results. Overall, the prior studies suggested that digital competencies play a pivotal role in shaping career choices and improving employability among undergraduate students. Higher digital literacy increases confidence, self-efficacy, and readiness to pursue diverse professional opportunities. The results provided that digital learning experiences strengthen students' digital skills and prepare them for technology-driven industries enhance their career in the emergent labor markets.

Conclusion

The current study was designed to determine the effect of digital competencies on the career choices of undergraduate students. The results of the study concluded that there was a moderate relationship between dimensions of digital competencies and career choice. Furthermore, there was a moderate relationship between digital competencies and career choice. There was a moderate effect of the dimensions of digital competencies on career choice; moreover, digital competencies have moderate effect on the career choice of undergraduate



students. Digital competencies within higher education play a pivotal role in career decisions and preparing graduates flux demands of the digital economy. Digital competencies are important to achieve career choice objectives.

Recommendations

Based on the results of the study, the recommendations are suggested for university policymakers, higher education institutions, teachers, students, and future researchers. Higher education institutions may integrate digital competencies into university curricula, focusing on the job market and workplace across disciplines. Universities may enhance career guidance services on digital competencies required for emerging professions. Institutions may provide digital infrastructure, tools, software, high-speed internet, and learning management systems. Teachers' professional development programs may be offered to faculty members to improve their own digital competencies and pedagogical use of technology. Students provided digital competencies to enhance their deep command on subject, focusing on labor market demand. Future studies are designed to explore the longitudinal impact of digital competencies on career progression.

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