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Information Technology in Algerian Higher Education: Faculty Practices, Research Uses, and Institutional Constraints

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***Abstract*—**The integration of information technology into higher education extends beyond the availability of digital equipment to encompass teaching practices, research communication, institutional support, and access to scholarly information. This article examines these dimensions through a descriptive, cross-sectional faculty survey conducted at Kasdi Merbah University of Ouargla, Algeria, in 2013. A structured questionnaire was distributed to 64 academics across three selected faculties; 50 usable questionnaires were analyzed using frequencies and percentages. The findings indicate substantial reported engagement with digital technology, although adoption was uneven. Most respondents (82%) used technological teaching aids, 76% considered technology-supported instruction preferable to conventional approaches, and 90% reported that their faculties provided Internet connectivity. For research purposes, 72% accessed digital libraries and 92% believed that Internet use contributed to the enrichment of scientific research. Nevertheless, access and effective use were constrained by unreliable connectivity, insufficient contemporary library resources, restricted access to specialized online content, and limited institutional arrangements for acquiring digital publications. Notably, 96% experienced Internet interruptions either sometimes or frequently. The findings reveal a distinction between the availability of basic digital tools and the organizational capacity required for sustained, equitable, and pedagogically meaningful integration. Interpreted as a historically situated institutional case rather than an assessment of present-day national conditions, the study supports coordinated investment in infrastructure, professional learning, research information systems, and academic digital services. The article contributes to understanding the sociotechnical dimensions of university digitalization in a developing higher-education setting.

***Keywords*—**Algerian higher education; information technology; university teachers; digital teaching; scientific research; institutional barriers.

1. Introduction

Universities depend on the production, circulation, and critical evaluation of knowledge. As information and communication technologies have become embedded in these processes, universities have encountered new opportunities to widen access to scholarly sources, diversify forms of instruction, and strengthen connections among students, academics, and research communities. Digitalization, however, is not simply a matter of introducing computers into classrooms. Its organizational implications reach into academic workloads, technical assistance, information policy, faculty development, and the conventions through which knowledge is produced and shared (Selwyn, 2014). The value of a technological innovation therefore depends on the conditions under which it is adopted and the educational purposes it serves.

The distinction between access and effective integration is especially significant for universities working under material and organizational constraints. A faculty may have an Internet connection without possessing the bandwidth, subscriptions, technical expertise, or stable learning environment necessary to use that connection consistently. Likewise, an instructor may employ presentation software while retaining largely conventional

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pedagogical practices. Measures of possession, use, perceived usefulness, and demonstrable educational outcomes must therefore be distinguished. A convincing assessment of digital transformation must consider the resources available to academics alongside the forms of practice these resources enable and the restrictions that make their use uneven (Ertmer, 1999; Mishra & Koehler, 2006).

In Algeria, the modernization of university teaching and research has been linked to wider demands for participation in international knowledge networks, increased institutional responsiveness, and more effective access to scientific information. Yet the extent to which such ambitions translate into everyday practice is an empirical question rather than an assumption. Academics occupy a strategic position within this process because they translate institutional arrangements into teaching activities, supervise student work, and undertake or disseminate research. Their perspectives provide insight into the interaction between technological provision and academic work, even if such perceptions cannot by themselves establish actual learning gains or research productivity.

This article examines faculty accounts of information-technology use at Kasdi Merbah University of Ouargla. The evidence comes from a cross-sectional survey carried out in 2013, a temporal boundary that is central to interpreting its implications. The investigation concerns three connected questions: Which technological tools were used in teaching? How were information-technology applications employed in scientific research? What material, technical, and organizational obstacles limited their effective utilization? The article integrates these questions into a single analysis of access, academic practice, and institutional capacity. Although the evidence belongs to an earlier phase of university digitalization, it remains useful as a documented local case for examining the difference between the presence of tools and their meaningful academic integration.

The contribution is threefold. First, the study describes both instructional and research-related uses of technology among faculty members rather than considering classroom practices in isolation. Second, it separates adoption indicators from reported benefits and institutional obstacles, reducing the risk of treating favorable attitudes as proof of effectiveness. Third, it interprets the evidence through complementary organizational and technology-acceptance perspectives, making visible the ways technological infrastructure, professional judgments, and institutional services interact. This analysis offers a historically grounded account of digital adoption and a set of transferable questions for subsequent institutional evaluation; it does not purport to measure the current state of digital transformation in Algeria.

2. Conceptual and Theoretical Background

2.1. Information technology as an academic and organizational resource

Information technology can be understood as the hardware, software, networks, and related technical processes used to collect, process, store, retrieve, and communicate data. In university settings, this definition includes both visible instructional devices—such as computers, projectors, and presentation applications—and less visible systems that support access to information, academic communication, and research administration. From a sociological perspective, technology is not an independent force that automatically determines institutional progress. Its significance is produced through relationships among people, professional norms, educational tasks, economic resources, and organizational structures.

For analytical purposes, the functions of information technology within universities can be distinguished into four categories. The first is instructional presentation: technology assists an instructor in explaining, displaying, and organizing course material. The second is interaction and communication: electronic mail, online learning platforms, and networked services facilitate contact between teachers and learners or among researchers. The third is knowledge access and production: digital libraries, search systems, electronic journals, statistical applications, and specialized software support scholarly activity. The fourth is institutional enablement: connectivity, technical support, digital subscriptions, purchasing mechanisms, and training determine whether the other three functions can operate reliably. These functions overlap, but separating them prevents a narrow device-based conception of university modernization.

The organizational dimension matters because a technology may be readily available in one department while remaining impractical in another. Fields requiring laboratory equipment, mathematical notation, statistical analysis, or language laboratories do not demand identical sets of tools. Equally, the cost of electronic resources, the availability of relevant software, and the reliability of connectivity may differ considerably across faculties. It is therefore inappropriate to infer that a university has undergone successful digital transformation merely because

most instructors report using computers. Rather, the pertinent question is whether institutional systems enable academic staff to deploy relevant technology for teaching, inquiry, collaboration, and dissemination.

2.2. Technology acceptance and the difference between use and benefit

The technology acceptance model offers a useful starting point for interpreting why academics adopt digital tools. Davis (1989) identifies perceived usefulness and perceived ease of use as important determinants of acceptance. In the university environment, usefulness may be associated with clearer instructional presentation, faster access to scholarly information, reduced administrative effort, or improved communication. Ease of use may depend on familiarity with software, access to appropriate equipment, and the availability of help when technical problems arise. These considerations are not the same as measured effectiveness: instructors can regard a tool as useful without independent evidence that it improves student achievement.

The unified theory of acceptance and use of technology extends this reasoning by incorporating performance expectancy, effort expectancy, social influence, and facilitating conditions (Venkatesh et al., 2003). Facilitating conditions are particularly relevant in a resource-constrained institution because willingness to use technology does not guarantee reliable access. A teacher may support digital instruction but abandon an online activity when connectivity fails. Conversely, the presence of a computer room or online portal may not produce meaningful use if the system is inconvenient or poorly aligned with teaching requirements. The tension between favorable attitudes and imperfect support is thus analytically important, rather than an inconsistency to be ignored.

Acceptance frameworks also have limitations when transferred to an educational institution. They emphasize individual intentions and use behavior, whereas university technology practices are strongly shaped by academic workload, disciplinary culture, organizational rules, and access to specialized sources. In this study, self-reported technology use is interpreted as evidence of engagement, while perceptions of superiority or effectiveness are presented as opinions rather than direct demonstrations of learning outcomes. This distinction is necessary because the survey did not include student performance measures, classroom experiments, or independently observed teaching sessions.

2.3. Pedagogical knowledge, adoption barriers, and institutional development

The technological pedagogical content knowledge framework emphasizes that effective educational technology use draws on the interaction of technological, pedagogical, and subject-matter knowledge (Mishra & Koehler, 2006). Choosing presentation software for a lecture, employing digital resources in an inquiry activity, and using disciplinary applications for a research project require different forms of expertise. A familiar program may make material more visible without transforming how students engage with it. A contextual assessment must therefore ask whether the selected technology supports the aims and methods of a particular discipline, rather than assuming that greater use is always preferable.

Ertmer (1999) distinguishes barriers external to teachers, such as insufficient equipment, time, or technical support, from barriers associated with beliefs and established practices. The distinction is relevant to higher education because some obstacles require institutional investment while others may be addressed through professional learning and opportunities to redesign courses. The two categories are nevertheless interdependent. Repeated network failures can discourage experimentation, while limited confidence in teaching with technology can reduce demand for available digital services. Any improvement strategy restricted to equipment procurement is therefore incomplete.

Rogers's (2003) account of diffusion of innovations provides an additional institutional perspective. Adoption unfolds through communication, perceived advantages, compatibility with existing practices, and the structure of social systems. In universities, disciplinary networks, peer practices, research laboratories, and academic leadership may influence the visibility and legitimacy of new tools. This perspective helps explain why technology may spread unevenly within a single institution, especially when its faculties have different material needs and professional routines.

More recent international discussions underline that technology should be evaluated in relation to specific educational purposes, equity, quality, and the conditions necessary for sustainable implementation (UNESCO, 2023). This contemporary perspective is used here only to interpret the continuing relevance of the 2013 case, not to retroactively assert the existence of later systems or technologies in the original fieldwork. Together, these approaches suggest a sociotechnical reading of university digitalization: institutional provision creates possibilities, academic agency determines forms of use, and organizational

and professional constraints condition the results.

2.4. Analytical dimensions and research questions

The study organizes the evidence around three dimensions. Instructional adoption concerns the use of digital aids, perceived sufficiency of equipment, and reported educational advantages. Research-related adoption concerns laboratory participation, access to networks and digital libraries, electronic communication, scholarly dissemination, and perceived contributions to scientific research. Institutional constraints concern interruptions in connectivity, access to contemporary information sources, acquisition of electronic publications, technical assistance, awareness activities, and access to specialized information. These dimensions correspond to the questionnaire structure and provide an integrated account of university practice.

The overarching research question is: To what extent did information technology support the academic work of university faculty members at the selected Algerian institution in 2013? It is addressed through three subsidiary questions: (1) What instructional technologies did faculty members use, and how did they evaluate those tools? (2) In what ways did they use digital services in scientific research and academic communication? (3) Which institutional and technical constraints were reported as limiting effective integration? Because the investigation is descriptive, the questions are exploratory; no causal hypotheses or inferential tests are imposed on the dataset.

3. Methodology

3.1. Research design and setting

The study employed a descriptive, cross-sectional survey design situated within a single-university case. Data were gathered during the spring of 2013, with questionnaire distribution occurring at the end of May and beginning of June. The institutional site was Kasdi Merbah University of Ouargla, a public university in southern Algeria. Three faculties were included: Science and Technology and Material Sciences; Humanities and Social Sciences; and Letters and Foreign Languages. These fields represented distinct types of academic work and made it possible to describe technology use across a limited range of disciplinary settings.

The design is appropriate for reporting the prevalence of stated practices and perceptions within the participating group. It is not an experimental evaluation of a technological intervention. Accordingly, terms such as adoption, accessibility, and perceived contribution refer to questionnaire responses rather than to observed behavior, objective institutional audits, or demonstrable improvements in student achievement. The study’s temporal, institutional, and respondent boundaries are maintained throughout the analysis.

3.2. Participants and sampling

University administrative statistics reported 976 permanent academics across the wider institution and 644 academics within the three selected faculties at the time of planning. The three faculties were selected on grounds of disciplinary relevance and practical accessibility; the sample distributed within them was allocated approximately proportionally to the numbers of academic staff. Sixty-four questionnaires were distributed: 40 in Science and Technology and Material Sciences, 12 in Humanities and Social Sciences, and 12 in Letters and Foreign Languages. Fifty complete, usable responses formed the analytic dataset, equivalent to approximately 78.1% of the questionnaires distributed.

The final faculty distribution was 29 respondents from Science and Technology and Material Sciences (58%), 11 from Humanities and Social Sciences (22%), and 10 from Letters and Foreign Languages (20%). In terms of academic rank, 23 respondents were assistant professors, class A (46%); 17 were assistant professors, class B (34%); five were lecturers, class A (10%); four were lecturers, class B (8%); and one was a full professor (2%). The proportion of assistant professors suggests that the sample was weighted toward relatively junior academic ranks. Because the faculties were selected purposively and the source does not document an independent random draw of individuals, the findings should not be treated as estimates from a probability sample of all Algerian university teachers.

Table 1. Questionnaire distribution and final analytic sample

Faculty	Distributed (n)	Usable (n)	Share of final sample
Science, Technology and Material Sciences	40	29	58%
Humanities and Social Sciences	12	11	22%

Table 1. Questionnaire distribution and final analytic sample *(continued)*

Faculty	Distributed (n)	Usable (n)	Share of final sample
Letters and Foreign Languages	12	10	20%
Total	64	50	100%

Note. Usable questionnaires represented 50/64 = 78.1% of questionnaires distributed. The study reports the outcome as a final analytic sample rather than a national representative sample.

3.3. Research instrument and data collection

Data collection centered on a structured questionnaire completed by participating academics. The instrument contained 33 questions, both closed and open-ended, organized into four sections. The first covered respondents' institutional and professional characteristics. The second addressed technological resources used in presenting teaching material. The third examined information-technology applications employed in scientific research. The fourth explored obstacles to greater technology use and institutional requirements for improvement. Background materials, institutional statistics, and documentary sources were also consulted to describe the setting.

The questionnaire was developed from the research questions and reviewed through an internal supervisory process before administration. The original study expressly indicates that it was not submitted to an external expert panel for instrument validation because of time and availability constraints. No coefficient of internal consistency, test–retest reliability, or formal measurement-validation study was reported. These circumstances do not negate the usefulness of descriptive responses, but they limit claims about the precision or generalizability of the instrument. The questionnaire was handed directly to participants over a short collection period. The source records 50 usable questionnaires after incomplete forms were excluded.

3.4. Data treatment and analytic conventions

The quantitative material was summarized with frequencies and percentages. No inferential statistics were reported, and the present analysis does not manufacture statistical significance tests, effect sizes, or respondent-level relationships that cannot be derived from aggregate counts. For yes/no items with a common sample of 50, percentages are calculated with 50 as the denominator. For questions permitting several answers, the original tabulations report proportions of all selections recorded, not proportions of the respondents. These multiple-response figures are identified explicitly and must not be interpreted as individual prevalence rates.

Several explanatory passages in the underlying tabulations disagree with the frequencies printed in the accompanying tables, particularly for digital publication, social-media communication, and ownership of personal sites. To avoid compounding these discrepancies, this article privileges arithmetically consistent frequencies in the tables, deriving percentages from the recorded counts where necessary. Indicators affected by unclear category labels or inconsistent subtotals are either excluded or presented cautiously. This procedure is an editorial reconciliation of reported aggregate evidence, not reanalysis of unavailable individual questionnaires. It provides a defensible basis for descriptive interpretation while making clear that further verification against original response records would be desirable.

4. Results

4.1. Technology-supported teaching

Teaching-related results suggest that digital tools had become familiar components of faculty practice by 2013, although their use was neither uniform nor fully supported. Forty-one of the 50 respondents (82%) reported using technological teaching aids in the presentation of course material; nine (18%) did not. The reported selection counts for specific tools included computers (34 selections), projection devices (30), information-display devices (18), and other resources (10). Because respondents could name more than one device, these selections cannot be divided by 50 to describe mutually exclusive user groups. The broad pattern nevertheless indicates that computers and projection equipment formed the core of reported instructional technology.

A range of specialized resources also appeared among open responses, including laboratory equipment, language laboratories, Internet services, electronic mail, images, maps, and electronic learning materials. Their diversity underlines the disciplinary specificity of technology use. For some respondents, a computer and projector were useful for explaining theoretical content; for others, discipline-specific devices were more central

to instruction. The availability of alternatives therefore matters more than a single universal model of technological teaching.

Perceived provision was mixed. Eighteen respondents (36%) judged the technological equipment provided by their faculty sufficient, 22 (44%) regarded it as sufficient only to some extent, and 10 (20%) considered provision insufficient. Although the combined group expressing full or partial sufficiency was relatively large, the modal answer was qualified approval. These results suggest that a basic technological presence coexisted with perceived gaps in quantity, availability, or fit for purpose. Such variation is consistent with the idea that institutions can reach a stage of partial adoption before they develop the capacity to support routine, flexible use across courses.

Table 2. Teaching-related access and perceptions (N = 50)

Indicator	Count	Percent
Uses technological teaching aids	41	82%
Does not use technological teaching aids	9	18%
Faculty equipment sufficient	18	36%
Faculty equipment partly sufficient	22	44%
Faculty equipment insufficient	10	20%
Prefers technology-supported to conventional teaching	38	76%
Does not express that preference	12	24%

Note. Categories describing the sufficiency of faculty equipment are mutually exclusive; each group sums to N = 50.

A separate item explored whether respondents considered technology-supported instruction preferable to traditional forms of teaching. Thirty-eight respondents (76%) answered positively, while 12 (24%) did not. This finding indicates a generally favorable evaluation of digital aids within the participating group. It should not be taken to mean that technology was invariably more effective, or that conventional approaches were pedagogically inappropriate. The survey asked teachers for their judgments; it did not compare courses taught through different methods or measure learning outcomes under controlled conditions.

The same caution applies to reported instructional advantages. Across 162 responses to a multiple-response question, the most frequently selected advantages were greater attention and motivation (35 selections), savings in teacher time and effort (31), alteration of conventional board-and-repetition practices (23), opportunities for teacher–student interaction (24), multisensory learning (22), and improved retention of information (19). Eight additional answers referred to other benefits. These are categories of perceived advantage, not independent estimates of educational gains. Nevertheless, the distribution reveals that instructors saw the value of digital tools as extending beyond the visual display of information: they associated technology with engagement, efficiency, interaction, and alternative forms of learning activity.

Table 3. Reported advantages of teaching technologies (multiple responses)

Perceived advantage	Selections (n)	Share of 162 selections
Increased attention and motivation	35	21.6%
Saving time and effort for instructors	31	19.1%
Opportunities for teacher–student interaction	24	14.8%
Changing routine methods of teaching	23	14.2%
Learning through more than one sense	22	13.6%
Greater retention of information	19	11.7%
Other advantages	8	4.9%
Total	162	100.0%

Note. Multiple selections were permitted. Percentages describe selections, not the percentage of the 50 academics who endorsed each benefit; totals may vary slightly because of rounding.

Responses to the software item support a similar interpretation of disciplinary diversity. The selected programs included PowerPoint (32 selections), Excel (26), SPSS (23), and other tools (10), among them word processing, discipline-specific mathematical or scientific applications, and e-learning environments. These figures describe 91 reported selections, not 91 separate participants. The combination of presentation, data-analysis, and specialized software suggests that the boundary between teaching and research technologies was porous. Programs used to process data or prepare material could serve more than one academic task, although the survey did not document the frequency, sophistication, or pedagogical design of particular uses.

The nine respondents who reported not using technological aids gave explanations related to the perceived suitability of their modules, the availability of an institutional computer, preferences, and practical circumstances. Such responses are useful reminders that non-use should not automatically be interpreted as resistance or incompetence. Some instructional tasks may be served adequately without devices; others may be constrained by limited access or an unfavorable cost–benefit judgment. The evidence therefore favors context-sensitive support rather than a requirement that every course use technology in identical ways.

4.2. Technology and scientific research

The second dimension of the survey examined the place of digital tools in research production and communication. Thirty-two respondents (64%) belonged to a research laboratory, while 18 (36%) did not. Of the 32 laboratory members, 18 (56.3%) stated that their laboratories were equipped with technologies supporting research activities, while 14 (43.8%) reported otherwise. Among the same 32 members, 26 (81.3%) reported that laboratory research was prepared in electronic form. These denominators are important: laboratory equipment and electronic production were asked of laboratory members and cannot legitimately be generalized as though all 50 respondents had answered those questions.

Electronic preparation of research material is a meaningful indicator of engagement with digital processes, but it does not necessarily establish public access or publication. Research may be prepared electronically while remaining inaccessible outside a department. Similarly, laboratory membership is an organizational status rather than a direct measure of research performance. The study nevertheless demonstrates that digital practices were embedded in some research units and that support varied between laboratories, raising questions about equity of access among different academic fields.

Internet access was reported as widely available. Forty-five respondents (90%) indicated that their faculties provided an Internet connection, compared with five (10%) who did not. Within the group reporting connectivity, 24 described its quality as moderate, 15 as weak, and six as good. Expressed against the 45 who reported an available connection, these categories represent 53.3%, 33.3%, and 13.3%, respectively. The figures reveal that the existence of a connection cannot be equated with adequate service quality. Two-thirds or more did not describe connectivity as good, an observation that complicates interpretations based on availability alone.

Forty-five respondents (90%) also reported benefiting from Internet services when preparing research. Multiple-response selections identified electronic mail as particularly prominent (44 of 90 selections), followed by file-transfer services, mailing lists, online searching, and other specialized services. These choices illustrate the centrality of communication and resource exchange to the early digital research environment. Although the table records the selection totals, it does not identify the intensity of use or whether the available services were accessed through university facilities, personal equipment, or both.

Table 4. Research-related activities and perceptions

Indicator	Yes (n)	Percent	Denominator
Member of a research laboratory	32	64%	50 faculty
Laboratory equipped for research	18	56.3%	32 laboratory members
Laboratory research prepared electronically	26	81.3%	32 laboratory members
Faculty provides Internet access	45	90%	50 faculty
Uses Internet services for research	45	90%	50 faculty
Email facilitates supervision and follow-up	38	76%	50 faculty
Benefits from e-learning services	30	60%	50 faculty

Table 4. Research-related activities and perceptions *(continued)*

Indicator	Yes (n)	Percent	Denominator
Uses digital libraries	36	72%	50 faculty
Participates in electronic journals/periodicals	21	42%	50 faculty
Has a personal website or blog	18	36%	50 faculty
Published papers in electronic scientific journals	22	44%	50 faculty
Communicates with students on social platforms	18	36%	50 faculty
Believes Internet use enriches scientific research	46	92%	50 faculty

Note. Counts for personal websites, electronic publishing, and social-platform communication follow the numerical tables, which are more internally consistent than some accompanying prose. These items represent self-report, not independently verified publication records.

Digital library access constituted another important research activity. Thirty-six respondents (72%) reported using digital libraries to obtain information from original sources; 14 (28%) did not. However, only 21 (42%) reported participation in specialized electronic journals or periodicals, and 22 (44%) reported having published a paper in an electronic scientific journal. These figures suggest that accessing scholarly material was more common than some forms of digital scholarly dissemination. Because the questions were distinct and the individual response matrix is unavailable, it is not possible to determine whether the same people who accessed digital libraries also participated in online journals or published electronically.

Ownership of an individual academic website or blog was less prevalent: the table recorded 18 affirmative responses (36%) and 32 negative responses (64%). The pattern suggests that research use depended more heavily on services and shared platforms than on individually maintained academic websites. Nevertheless, ownership of a personal website is not a reliable proxy for scholarly productivity; academics may publish through institutional repositories, professional networks, or journal websites without maintaining an independent site. The survey does not provide evidence sufficient to assess these alternatives.

Electronic mail was perceived as helpful for instruction-related research and supervision. Thirty-eight respondents (76%) agreed that it facilitated supervisory and follow-up activities, and 30 (60%) reported benefiting from e-learning services. The latter result was accompanied by negative accounts of technical faults, organizational limitations, and the pressure of academic workloads. Taken together, the findings portray electronic communication as an established yet uneven practice: routine messaging was accepted by many, whereas more structured digital-learning services faced obstacles in both technical functionality and sustained engagement.

A large majority—46 respondents (92%)—considered Internet use beneficial to the enrichment of scientific research. This is among the clearest attitudinal findings in the dataset, but its interpretation is carefully bounded. It records the belief that the Internet supports research rather than demonstrating an increase in the number, quality, or citation impact of publications. Such perceptions may reflect faster access to information, correspondence with collaborators, the ability to retrieve journals and books, or the convenience of electronic preparation. Distinguishing perceived contribution from observable output is essential when translating survey evidence into policy recommendations.

4.3. Institutional barriers and support mechanisms

The third survey dimension investigated the conditions that facilitated or impeded technological integration. The most prominent problem involved connectivity. Twenty-four respondents (48%) experienced repeated interruptions or weak transmission when using university Internet services, another 24 (48%) experienced them sometimes, and only two (4%) reported no such difficulties. Thus, 48 out of 50 respondents—96%—encountered network disruption at least occasionally. The result qualifies the favorable availability indicator reported earlier: institutions may nominally provide access while users still experience unreliable service that interferes with teaching, communication, and research tasks.

The adequacy of library resources was another concern. Only 12 respondents (24%) indicated that modern information sources were adequately available through the faculty library. Twenty-seven (54%) considered them insufficient, and 11 (22%) regarded them as unavailable. In combination, more than three-quarters did not regard

provision as adequate. For scholarship requiring access to recent international research, the distinction between a basic Internet connection and accessible, current, discipline-relevant literature is consequential. Researchers need not only a way to connect but also the institutional means to obtain relevant and legitimate scholarly content.

The procurement of digital materials represented a particularly pronounced obstacle in the 2013 case. Forty-nine respondents (98%) stated that the university did not provide mechanisms described in the questionnaire as online-purchasing cards for acquiring digital resources. This item must be understood within the payment infrastructure and terminology of the period; it should not be treated as evidence that similar constraints have persisted unchanged. Its broader organizational meaning is that access to fee-based electronic materials can be blocked by purchasing procedures even where computers and networks are available.

Technical support was perceived less uniformly. Twenty-six respondents (52%) reported the availability of technicians to assist with the use of technological equipment, while 24 (48%) did not. The distribution suggests that support was not consistently experienced across the participating group. Nor can the figures establish whether assistance, where available, was sufficiently rapid, specialized, or continuously accessible. Nonetheless, the near-even split supports the view that digital services require personnel and processes, not only machines.

Table 5. Institutional support and reported constraints (N = 50)

Indicator or response	Count	Percent
Internet interruptions: frequent	24	48%
Internet interruptions: occasional	24	48%
Internet interruptions: none	2	4%
Library sources: sufficient	12	24%
Library sources: insufficient	27	54%
Library sources: unavailable	11	22%
Online purchasing cards not provided	49	98%
Technical assistance available	26	52%
Technical assistance unavailable	24	48%
University organizes technology awareness activities	40	80%
No such awareness activities reported	10	20%

Note. The purchasing-card item refers to the mechanisms named in the 2013 questionnaire, not contemporary university procurement arrangements.

Awareness activities were more positively assessed. Forty respondents (80%) indicated that the university organized scientific or professional events relevant to information technology, while 10 (20%) did not. These events were described in terms of study days, seminars, conferences, workshops, and other forms of academic exchange. Their presence suggests institutional recognition of digitalization as a subject of professional discussion. Yet an awareness meeting is not equivalent to sustained training, and the survey did not evaluate the duration, curricular integration, accessibility, or measured effects of these activities on faculty competence.

The final item invited respondents to identify academic information needs and difficulties. The multiple-response selections placed particular emphasis on access to information databases (42 selections), an academic information network connecting universities (37), and modernization of educational systems and curricula (29). In a separate group of obstacle selections, inability to access certain specialized websites was prominent (38 selections), followed by concerns about inaccurate research information and the credibility of online material. Because the questionnaire used multiple-response categories and the table contains nonexclusive selections, these findings are best read as priorities that respondents repeatedly identified rather than as population-wide prevalence estimates.

The open responses connected these problems to more concrete circumstances, including weak Internet flow, restricted access to certain digital sources, insufficient equipment or software skills, and differences in academic workload. Some participants also expressed concern about the reliability of information obtained online. These

difficulties are related but analytically distinct. Bandwidth is an infrastructure problem; subscriptions and purchasing procedures are resource-governance problems; source evaluation is an information-literacy problem; and pedagogical application requires discipline-sensitive professional knowledge. Their coexistence explains why comprehensive improvement would require coordinated action across institutional units.

5. Discussion

5.1. Adoption without full institutional integration

The principal finding is a pattern of partial rather than absent technological integration. Most respondents reported using digital teaching aids, expressed a preference for technology-supported instruction, and perceived an important contribution of the Internet to research. At the same time, equipment was only partly sufficient for many respondents, connections were frequently interrupted, and scholarly information sources were not always accessible. The results therefore challenge a simple binary distinction between digitally advanced and digitally excluded universities. The institution displayed forms of adoption while continuing to face obstacles that limited their reliability, depth, and reach.

This finding can be understood through the concept of facilitating conditions in technology acceptance research. Favorable judgments of a technology's value may increase readiness to use it, but users still require practical support and access (Davis, 1989; Venkatesh et al., 2003). In the present case, enthusiasm and obstacles were not mutually exclusive: a respondent could approve of digital instruction and still lack adequate tools, subscriptions, or dependable connections. Likewise, a laboratory could prepare research in electronic form without having equal access to specialized software or information. Institutional development therefore depends on aligning user needs with stable resources and workable administrative procedures.

The distinction also illuminates how universities should measure digital progress. Counting devices or connecting buildings may establish an infrastructure baseline, but these measures do not capture the quality of interaction, the continuity of service, or the scholarly value of accessible resources. The high proportion of respondents encountering interruptions despite reported Internet availability is an especially clear example. A better institutional assessment would include service uptime, measured bandwidth, access to subscribed databases, equipment availability by discipline, help-desk response times, and faculty-reported usability. Such measures could explain both the conditions of use and the scope of the remaining barriers.

5.2. Pedagogy, perceived effectiveness, and disciplinary fit

Instructional responses suggest that academic staff recognized several possible advantages of digital tools, including clearer presentation, greater engagement, time savings, and opportunities for communication. These claims align with the proposition that technology can support teaching when technological knowledge is integrated with pedagogical and content knowledge (Mishra & Koehler, 2006). They do not, however, demonstrate that the reported technologies improved learning. In a descriptive opinion survey, greater motivation and retention are perceptions. The actual educational value of a tool would have to be examined in relation to intended learning outcomes, instructional design, student engagement, accessibility, and the quality of assessment.

The disciplinary distribution adds a further caution. Projection equipment, statistical applications, and laboratory tools perform different functions. A uniform policy requiring the same applications in every faculty might inadvertently privilege visibility over relevance. A more defensible approach would enable departments to identify the educational problems that technology can help resolve and provide tailored resources accordingly. For example, language departments may prioritize interaction and media resources, while scientific departments may require specialized analytical software and instruments. The survey does not directly test these field-specific priorities, but the diversity of named tools provides a rationale for institutional planning organized around academic tasks rather than equipment totals alone.

Professional learning should be treated similarly. Short awareness activities may generate interest, yet effective course redesign ordinarily requires practice, peer exchange, and support over time. Ertmer's (1999) distinction between external and internal barriers suggests that access and confidence are mutually reinforcing. It would be unwise either to attribute non-use entirely to faculty attitudes or to assume that better equipment automatically produces pedagogical innovation. Institutional strategies should address practical access and the professional capacity to make informed decisions about when, why, and how digital resources should be used.

5.3. Research access, communication, and scholarly participation

The research-related findings reveal another important distinction: retrieving information was more widespread than publishing or maintaining a visible academic presence online. Digital library use was reported by 72% of respondents, compared with 44% reporting electronic-journal publication and 36% reporting ownership of a website or blog. These results cannot establish a progression from reading to publishing at the individual level, but they indicate that different aspects of scholarly digital participation were unevenly distributed. Access to research materials, production of scholarship, and dissemination are separate activities requiring different competencies and institutional arrangements.

The reported importance of electronic mail for supervision and collaboration is consistent with the broader social function of information technology. Communication tools enable researchers to exchange documents, contact colleagues, and maintain academic relationships beyond the physical campus. Nonetheless, scientific communication also requires reliable quality control, secure institutional services, legitimate publication channels, and the ability to evaluate the provenance of electronic information. Respondents' concerns about information accuracy reinforce the importance of research and information literacy alongside technical connectivity.

The central policy implication is that research digitalization should be considered an ecosystem. Researchers need authentic and current bibliographic sources, digital repository services, software where appropriate, reliable authentication, mechanisms for legitimate subscription acquisition, and effective communication support. A modern institutional response would evaluate each of these components rather than treating Internet access as a sufficient proxy for research readiness. The later UNESCO (2023) discussion of technology in education similarly emphasizes the importance of assessing tools in relation to purposes and context. This does not make the 2013 results current, but it helps explain their conceptual relevance to subsequent debates on digital ecosystems.

5.4. The organizational meaning of uneven access

From a sociology-of-organizations perspective, uneven technological integration is not simply a shortfall in procurement. It reflects relationships among budgets, institutional decision-making, academic specialization, administrative procedures, technical expertise, and the established division of labor. The responses concerning library materials, online purchasing mechanisms, and technical assistance show that technology policies are implemented through several organizational units. When these units are not coordinated, a faculty member may possess the skills and motivation to use a resource but remain unable to acquire or access it.

Rogers (2003) draws attention to the way innovations spread within social systems rather than being adopted simultaneously by every user. The present findings are compatible with uneven diffusion, but the survey does not include longitudinal observations necessary to establish diffusion stages or adoption trajectories. Its contribution is narrower: it documents the coexistence of reported routine use and barriers that would plausibly inhibit further adoption. Future research could compare faculties, measure changes through time, and investigate how leadership, peer collaboration, service quality, and training influence actual practice.

The historical context is essential. The survey was administered in 2013, before major subsequent developments in digital learning, including the expansion of mobile services, new online teaching environments, and the accelerated reliance on remote education in later years. No direct inference about present-day conditions at Kasdi Merbah University, other Algerian universities, or Algerian faculty as a whole follows from these findings. The study is best understood as evidence of what institutional actors reported at a particular stage, and as a starting point for designing contemporary comparisons.

6. Institutional Implications and Recommendations

The analysis supports a multidimensional approach to university digital development. The first priority is reliability rather than nominal access. Institutions should assess the actual quality of network service in the spaces where teaching and research occur, identify high-interruption periods, and plan technical upgrades around documented academic needs. User-facing measures such as uptime, response time, and successful authentication to research platforms would allow administrators to evaluate service improvement more directly than general declarations that Internet access exists.

A second priority is equitable access to scholarly information. Libraries and academic departments should jointly identify the digital sources most relevant to teaching and research, assess subscription gaps, and provide guidance on legitimate open-access alternatives and institutional resources. Procurement arrangements should allow researchers to request electronic materials through clear and accountable procedures. In the original setting,

a reported obstacle concerned online-purchasing cards; the transferable issue is the institutional capacity to obtain scholarly material, not the continued relevance of that specific payment method.

Third, faculty development should move beyond occasional awareness events toward discipline-sensitive support. Training can address digital information literacy, critical evaluation of sources, appropriate educational software, academic communication, digital accessibility, and the design of technology-supported learning activities. Small communities of practice within and across faculties may help instructors discuss successful adaptations and recurring difficulties. A help-desk or faculty-level technical service with defined responsibilities would complement such initiatives by reducing the practical cost of experimentation and routine use.

Fourth, research support should link laboratories, libraries, and information-technology units. Support services can assist researchers with specialized software, responsible data handling, reputable dissemination channels, and access to scholarly repositories. Researchers should be able to distinguish searching, accessing, evaluating, preparing, and publishing electronic scholarship, as each process involves different quality requirements. The prevalence of favorable attitudes toward Internet use in the dataset provides a reason to examine these services, but not proof that their introduction would automatically increase research productivity.

Finally, institutional monitoring should combine faculty perceptions with independently observed indicators and student perspectives. Repeat surveys could examine whether the perceived sufficiency of equipment, quality of connectivity, digital library access, training needs, and adoption of digital practices have changed since the historical baseline. Complementary classroom observation, interviews, document review, and records of platform use would help distinguish intended policies from practical implementation. Evaluations should be designed around specific educational and research goals and should examine possible inequities across disciplines and categories of academic staff.

7. Limitations and Directions for Further Research

The findings must be interpreted within several methodological limitations. First, the evidence comes from one university and three selected faculties, with only 50 usable responses. Faculty selection was purposive and the evidence does not document a complete probability-sampling procedure for individuals. The sample cannot represent the full range of Algerian higher education, and percentages from a small group should not be overgeneralized. In particular, cross-faculty comparisons would require adequate numbers within each faculty and clearly specified sampling procedures.

Second, the study is descriptive and relies on self-report. Technology use, availability, perceived effectiveness, and research contribution were not independently verified through lesson observations, usage records, student learning measures, or bibliometric data. Consequently, the results support claims about reported practices and perceptions, not causal effects on teaching quality or scientific productivity. The questionnaire's measurement properties were not formally validated; questions may have been understood differently across respondents or disciplines. An updated study could pilot its instrument, obtain expert review, and report reliability and validity evidence appropriate to the constructs measured.

Third, several original tables and their accompanying explanations disagree on the direction of specific percentages. The present article has used internally consistent numerical counts for these indicators and avoided analyses that depend on questionable subtotals. This approach is transparent but cannot fully substitute for access to the original participant-level responses. Fourth, the data were gathered in 2013 and should not be confused with a current audit of university digitalization. Subsequent institutional and technological developments may have substantially altered the environment. A contemporary replication would be required before discussing present conditions.

Further research might adopt a longitudinal or comparative mixed-methods design across several universities, use objective connectivity and digital-resource indicators, examine disciplinary differences, and investigate how faculty members decide whether a technology is suitable for a task. Interviews could explore how workloads, professional expectations, technical service, and research-access policies influence adoption. Studies incorporating student learning evidence and research-process outcomes could then examine questions that the present perception-based dataset was not designed to answer.

8. Conclusion

The 2013 faculty survey at Kasdi Merbah University of Ouargla shows that information technology had an established, though uneven, place in teaching and scientific research. Most participating academics reported using

technological aids in class, regarded their use favorably, and recognized the potential of Internet services to enrich research. Digital libraries, electronic mail, and laboratory-based electronic preparation were also present within the reported academic practices. These findings demonstrate engagement with technology, but they do not establish comprehensive institutional transformation.

The central challenge was the distance between access and dependable use. Respondents frequently reported connectivity disruptions, insufficient contemporary library sources, barriers to acquiring digital materials, and inconsistent technical assistance. Their experiences suggest that the academic contribution of information technology depends on interconnected technical, pedagogical, informational, and organizational conditions. The study therefore supports a coordinated model of institutional development that combines infrastructure quality, disciplinary fit, information access, sustained faculty support, and evidence-based monitoring. As a historical case, the findings provide a useful benchmark and conceptual framework for subsequent investigation rather than a statement about present-day Algerian universities.

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