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E-Training and organizational development among university librarians: a field study at Ziane Achour University, Djelfa, Algeria

ABSTRACT

Universities increasingly rely on digital training to strengthen their staff's capabilities; however, its contribution to institutional organizational development remains an empirical question. The study aimed to examine the effect of electronic training on organizational development among librarians at Ziane Achour University of Djelfa, Algeria, and to determine whether both variables differed according to gender and length of service. A descriptive-correlational field design was employed, and a validated questionnaire was administered through a census to 52 librarians working in the university libraries. The instrument comprised 40 items on electronic training, distributed across six dimensions, and 38 items on organizational development. Data were analyzed using simple linear regression, an independent-samples t-test, and one-way ANOVA. The results showed a positive, moderate, and statistically significant effect of electronic training on organizational development ($r_{xy} = 0.503$; $R^2 = 0.253$; $F = 16.891$; $p < 0.05$). Electronic training ($M = 157.46$) and organizational development ($M = 151.85$) presented high overall levels. No statistically significant differences were observed according to gender or length of service. It was concluded that electronic training partially enhanced organizational development and that its training and development opportunities were distributed equitably among the groups studied.

Keywords: electronic training; organizational development; librarians; universities; gender; length of service.

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Formación electrónica y desarrollo organizacional entre bibliotecarios universitarios: un estudio de campo en la Universidad Ziane Achour, Djelfa, Argelia

RESUMEN

Las universidades recurren cada vez más a la formación digital para fortalecer las capacidades de su personal; sin embargo, su contribución al desarrollo organizacional institucional continúa siendo una cuestión empírica. El estudio tuvo como objetivo examinar el efecto de la formación electrónica sobre el desarrollo organizacional entre los bibliotecarios de la Universidad Ziane Achour de Djelfa, Argelia, así como determinar si ambas variables difirieron

según el género y la antigüedad laboral. Se empleó un diseño de campo descriptivo-correlacional y se aplicó, mediante censo completo, un cuestionario validado a los 52 bibliotecarios de las bibliotecas universitarias. El instrumento comprendió 40 ítems sobre formación electrónica, distribuidos en seis dimensiones, y 38 ítems sobre desarrollo organizacional. Los datos se analizaron mediante regresión lineal simple, prueba t para muestras independientes y ANOVA de un factor. Los resultados evidenciaron un efecto positivo, moderado y estadísticamente significativo de la formación electrónica sobre el desarrollo organizacional ($r_{xy} = 0,503$; $R^2 = 0,253$; $F = 16,891$; $p < 0,05$). La formación electrónica ($M = 157,46$) y el desarrollo organizacional ($M = 151,85$) presentaron niveles generales altos. No se observaron diferencias estadísticamente significativas según género o antigüedad laboral. Se concluyó que la formación electrónica impulsó parcialmente el desarrollo organizacional y que sus oportunidades se distribuyeron equitativamente entre los grupos estudiados.

Palabras clave: formación electrónica; desarrollo organizacional; bibliotecarios; universidades; género; antigüedad laboral.

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Aprendizagem eletrônica e desenvolvimento organizacional entre bibliotecários universitários: um estudo de campo na Universidade Ziane Achour, Djelfa, Argélia

RESUMO

As universidades estão cada vez mais a recorrer à aprendizagem eletrônica para reforçar as capacidades dos seus funcionários; no entanto, o seu contributo para o desenvolvimento organizacional institucional permanece uma questão empírica. Este estudo teve como objetivo examinar o efeito da aprendizagem eletrônica no desenvolvimento organizacional entre bibliotecários da Universidade Ziane Achour em Djelfa, Argélia, e determinar se ambas as variáveis diferem de acordo com o género e o tempo de serviço. Foi utilizado um desenho de estudo de campo descritivo-correlacional, tendo sido aplicado um questionário validado a todos os 52 bibliotecários universitários através de uma abordagem censitária. O instrumento compreendia 40 itens sobre aprendizagem eletrônica, distribuídos por seis dimensões, e 38 itens sobre desenvolvimento organizacional. Os dados foram analisados utilizando regressão linear simples, testes t de amostras independentes e ANOVA unidirecional. Os resultados mostraram um efeito positivo, moderado e estatisticamente significativo do e-learning no desenvolvimento organizacional ($r_{xy} = 0,503$; $R^2 = 0,253$; $F = 16,891$; $p < 0,05$). Tanto o e-learning ($M = 157,46$) como o desenvolvimento organizacional ($M = 151,85$) apresentaram níveis geralmente elevados. Não foram observadas diferenças estatisticamente significativas em relação ao género ou à antiguidade. Concluiu-se que o e-learning impulsionou parcialmente o desenvolvimento organizacional e que as suas oportunidades foram distribuídas equitativamente pelos grupos estudados.

Palavras-chave: e-learning; desenvolvimento organizacional; bibliotecários; universidades; género; antiguidade.

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INTRODUCTION

Organizations today operate under conditions of rapid and continuous change, driven above all by technological advancement and the information revolution, conditions that have made continuous adaptation and organizational renewal a condition for institutional survival rather than an optional strategy. Organizational change functions as a deliberate process aimed at improving performance, raising efficiency, and keeping pace with shifts in both the internal and external environment, and training and development sit at the center of that process, since equipping people with the skills and knowledge needed to meet new challenges is what makes organizational adaptation possible in practice rather than merely in principle.

Economic and technological change has intensified competition both within and between organizations, placing a premium on output and productivity, and human resource development, training, organizational development, and performance appraisal chief among its mechanisms, has correspondingly grown in importance as the pathway through which organizations translate technological opportunity into improved outcomes. The expanding use of computers, the internet, and digital communication technologies has brought a qualitative shift in how training itself is delivered, with electronic training (e-training) emerging as a flexible, accessible alternative to traditional, place-bound instruction, one that reduces geographic and temporal constraints, lowers operational costs, and can be tailored to varied learning needs through interactive content.

University libraries sit squarely within this shift. Librarians play a pivotal role in supporting the educational and research missions of the institutions they serve, managing information resources and providing the knowledge infrastructure researchers and students depend on; as reliance on digital resources and electronic services grows, librarians' own skills and knowledge need to keep pace, making e-training a natural mechanism through which university libraries can help their staff adapt to ongoing technological and organizational change. This study accordingly examines the effect of e-training on organizational development among librarians at Ziane Achour University in Djelfa, asking how far this particular training modality contributes to librarians' capacity to adapt to change, improve job performance, and, through that, support the university's broader strategic objectives.

This resolves into the study's central research problem: is there a statistically significant effect, at the $\alpha \leq 0.05$ level, of e-training on organizational development among librarians at Ziane Achour University, Djelfa? From this general question follow five more specific ones: what is the level of e-training among these librarians; what is the level of organizational development among them; do e-training levels differ by gender; do e-training levels differ by seniority; and do organizational development levels differ by gender and by seniority, respectively.

The study accordingly tests one main hypothesis, that a statistically significant effect of e-training on organizational development exists at the $\alpha \leq 0.05$ level, alongside six sub-hypotheses: that the level of e-training among these librarians is high; that the level of organizational development among them is high; and that no statistically significant differences in either variable exist by gender or by seniority.

The study's significance follows from two considerations in particular: first, e-training is no longer a discretionary add-on but an operational necessity for organizations seeking to keep pace with accelerating technological change, and remote, flexible training has become correspondingly indispensable for building and updating staff competencies; second, e-training functions as a genuine tool of organizational development in its own right, contributing directly to staff capacity-building, overall institutional performance, and adaptability in the face of ongoing change, which makes understanding its actual effect, rather than simply assuming it, a matter of direct practical relevance for university library management.

For the purposes of this study, training refers, in its terminological sense, to a learning process through which individuals acquire the skills and knowledge needed to achieve organizational goals, tied to the nature of the work itself and aligned with organizational policy and planning; e-training refers to the process through which an individual or group acquires knowledge, skills, and attitudes through electronic media, covering communication, information transfer, skill acquisition, and interaction between trainer and trainee. Operationally, e-training is defined here as the total score a librarian obtains on the 40-item, six-dimension e-training scale used in this study (self-efficacy, training motivation, ease of use, interaction and communication, organizational climate, and technical requirements), scored on a five-point Likert format. Organizational development, correspondingly, refers to a long-term plan for improving an organization's performance in problem-solving, renewal, and management practice, resting on collaborative effort among administrators, attentiveness to the organizational environment, and the practical application of behavioral science; operationally,

it is defined here as the total score a librarian obtains on the 38-item organizational development scale used in this study, scored on the same five-point format.

Taken together, these definitions frame the study's underlying logic: if e-training genuinely functions as a mechanism of human-capital development rather than simply a compliance exercise or a box to be checked, its effects should be visible not only in librarians' own reported competence but in broader indicators of organizational adaptability and performance, which is precisely the relationship the main hypothesis sets out to test. Confirming that relationship empirically, rather than simply assuming it on the strength of the wider literature's general enthusiasm for digital training, is what motivates treating this as a field study built around a specific institutional population rather than a purely conceptual discussion of e-training's presumed benefits. The choice to study gender and seniority alongside the main effect, rather than as an afterthought, reflects a further practical concern: an institution investing in e-training needs to know not only whether it works in aggregate, but whether its benefits reach all staff groups equally, since a program that raises average outcomes while leaving particular groups behind would call for a different institutional response than one that benefits everyone roughly in step.

This study's e-training construct also connects to several strands of well-established theory worth situating explicitly. Its self-efficacy dimension draws conceptually on Bandura's (1997) account of self-efficacy as a person's belief in their own capacity to execute the behaviors a given task requires, a belief widely shown to shape how readily individuals take up and persist with new technology-mediated skills. Its ease-of-use and technical-requirements dimensions likewise echo the technology-acceptance literature, particularly Davis's (1989) original model and Venkatesh et al.'s (2003) unified extension of it, both of which identify perceived ease of use and facilitating conditions as central predictors of whether a new technology is adopted willingly or resisted. On the training side, Kirkpatrick's (1994) four-level framework, reaction, learning, behavior, and organizational results, offers a useful reminder that positive self-reported reactions to training, of the kind this study's e-training scale captures, do not automatically guarantee downstream organizational results, which is exactly the empirical gap the main hypothesis is designed to test rather than assume. On the organizational-development side, the construct used here follows the broader definition set out by Cummings and Worley (2014), who describe organizational development as a planned, organization-wide effort to increase effectiveness through behavioral-science-based interventions, a definition consistent with the operational scale adopted in this study.

The construct also draws, more broadly, on the wider e-learning and professional-development literatures. Its interaction-and-communication dimension echoes Garrison, Anderson, and Archer's (2000) account of critical inquiry in computer-mediated learning environments, while its emphasis on flexible, technology-delivered instruction is consistent with Bates's (2015) and Rosenberg's (2001) broader treatments of digital-age teaching and e-learning strategy, with Clark and Mayer's (2016) evidence-based guidelines for multimedia instructional design, and with the sector-level growth in distance-education enrollment documented by Allen and Seaman (2017) and by Alshahrani and Ward's (2013) case study of sustainable e-learning implementation in higher education; Zhang et al. (2004) offer a relevant note of caution here, arguing that e-learning is best understood as a complement to, rather than a wholesale replacement for, classroom-based instruction. On the evaluation side, Guskey's (2000) framework for evaluating professional development complements Kirkpatrick's four-level model in grounding the study's training-outcome measures, and Noe's (2017) treatment of employee training and development situates e-training within the broader human-resource-development literature. On the organizational-development side, the construct also connects to Robbins and Judge's (2017) account of organizational behavior and to Meyer and Allen's (1991) three-component model of organizational commitment, both of which inform how librarians' engagement with, and response to, organizational change is understood in this study.

Methodology

This study adopted a descriptive, correlational field design (Creswell, 2014), appropriate to a research problem concerned with measuring the level of two variables and testing the statistical relationship, and group differences, between them. Data were collected via questionnaire, the instrument judged best suited to the study's aims, administered as a full census, rather than a sample, of the 52 librarians employed across the university libraries at Ziane Achour University, Djelfa. The study was conducted between March and May 2025.

Two validated scales were used. E-training was measured using a 40-item scale, adapted from an existing instrument (AlAli & Saleh, 2022) and organized across six dimensions: self-efficacy (6 items), training motivation (6 items), ease of use (6 items), interaction and communication (8 items), organizational climate (7 items), and technical requirements (7 items), all items positively worded. Organizational development was measured using a 38-item scale, likewise adapted from an existing instrument (Çetin & Karaokur Akdağ, 2022), with all items positively worded. Both scales used a five-point Likert format (Strongly Agree = 5 through Strongly Disagree = 1).

Instrument validity was assessed through internal consistency, correlating each dimension (for e-training) or item (for organizational development) with the corresponding total scale score. For e-training, all six dimension-level Pearson correlations were high and significant at the 0.01 level, ranging from $r = 0.675$ (Ease of Use) to $r = 0.778$ (Organizational Climate). For organizational development, item-level correlations with the total scale ranged from $r = 0.411$ (Item 37) to $r = 0.752$ (Item 11), all significant at the 0.01 level, indicating that both scales' components were internally homogeneous with, and representative of, the constructs they were designed to measure.

Reliability was assessed using Cronbach's alpha, summarized in Table 1 below. The overall e-training scale returned $\alpha = 0.852$, with dimension-level reliability ranging from $\alpha = 0.744$ (Self-Efficacy) to $\alpha = 0.833$ (Technical Requirements); the overall organizational development scale returned $\alpha = 0.839$. Both figures indicate good internal-consistency reliability by conventional psychometric standards (Hair et al., 2010).

Tabla 1.

Internal Consistency of the E-Training and Organizational Development Scales

Scale / Dimension	No. of Items	Cronbach's Alpha
Self-Efficacy	6	0.744
Training Motivation	6	0.765
Ease of Use	6	0.778
Interaction & Communication	8	0.818
Organizational Climate	7	0.797
Technical Requirements	7	0.833
Overall E-Training Scale	40	0.852
Overall Organizational Development Scale	38	0.839

Note. Internal consistency was assessed using Cronbach's alpha coefficient. The e-training scale consisted of 40 items distributed across six dimensions, while the organizational development scale comprised 38 items. The coefficients obtained indicate adequate internal consistency for the scales and their dimensions

Sample demographics are summarized in Tables 2a and 2b. The census of 52 librarians was predominantly male (63.46%) and concentrated in the 5-to-15-year seniority band (71.15%), with only a single librarian (1.92%) reporting more than 25 years of service.

Tabla 2.

Distribution of Librarians by Gender

Gender	Frequency	Percentage
Male	33	63.46%
Female	19	36.54%
Total	52	100%

Note. The table presents the frequency and percentage of the 52 librarians who participated in the census of the university libraries at Ziane Achour University, Djelfa. Percentages are based on the total number of participants.

Tabla 3.

Distribution of Librarians by Work Seniority

Work Seniority	Frequency	Percentage
Less than 5 years	10	19.23%
5 to 15 years	37	71.15%
16 to 25 years	4	7.69%
More than 25 years	1	1.92%
Total	52	100%

Note. The table presents the frequency and percentage of librarians according to their years of service. The distribution comprises four seniority categories and corresponds to the total of 52 participants

Data were analyzed using IBM SPSS, following standard procedures for the software (Pallant, 2016). The main hypothesis was tested using simple linear regression, with e-training as the predictor and organizational development as the outcome. The first two sub-hypotheses, concerning the level of each variable, were tested by comparing observed item, dimension, and scale-level means against a three-category evaluation scale (low: 1.00–2.33; moderate: 2.34–3.67; high: 3.68–5.00), derived by dividing the five-point scale's range by three category levels. The remaining four sub-hypotheses, concerning differences by gender and by seniority, were tested using independent-samples t-tests (gender, two groups) and one-way ANOVA (seniority, four groups), both evaluated at $\alpha = 0.05$.

It is worth noting explicitly, given how it bears on interpreting the sub-hypothesis results, that the census design used here means the 52 respondents are not a sample drawn from a larger population of Ziane Achour University librarians but constitute that population in its entirety; statistical significance testing was nonetheless applied throughout, consistent with the original study's own approach and with common practice in organizational research, treating the observed group as if it were a sample subject to random variation, a convention this restructuring preserves rather than alters, while flagging it here for readers evaluating the seniority-based comparisons in particular, given how unevenly the four seniority categories are populated. This is a standard tension in organizational census research, where the population of interest is often small enough that a full census is feasible, but the resulting subgroup comparisons can still be underpowered in exactly the way a random sample drawn from a larger population would be.

RESULTS

This section reports the study's findings for the main hypothesis (the regression effect of e-training on organizational development) followed by the six sub-hypotheses (the level of each variable, and differences in each by gender and seniority), presented here as reported in the original analysis.

Main Hypothesis: Effect of E-Training on Organizational Development

Table 4

Results of the Simple Linear Regression Between E-Training and Organizational Development.

Dependent Variable	rx _y	R ²	Regression Coeff. (b)	t-value	F-value	Sig.
Organizational Development	0.503	0.253	0.402	4.110	16.891	0.000

Note. The table presents the results of the simple linear regression analysis, with e-training as the predictor variable and organizational development as the dependent variable. The correlation coefficient, coefficient of determination, regression coefficient, t-statistic, F-statistic, and significance level are included. The analysis was conducted at a significance level of $\alpha = 0.05$

The correlation coefficient was $r_{xy} = 0.503$, indicating a moderate positive correlation between the two variables. The coefficient of determination was $R^2 = 0.253$, meaning e-training statistically accounted for 25.3% of the variance in organizational development scores, with the remaining 74.7% attributed in the original analysis to measurement error, sampling factors, and other unmeasured variables. The regression equation was reported as $Y = 88.54 + 0.4X$. The t-test for the regression slope returned $T_{cal} = 4.110$ ($T_{tab} = 2.009$, $p = 0.006$), and the F-test for overall model fit returned $F_{cal} = 16.891$ ($F_{tab} = 8.156$, $p = 0.000$), both exceeding their respective critical values at $\alpha = 0.05$. On this basis, the main hypothesis, that e-training has a statistically significant effect on organizational development, was supported.

Sub-Hypothesis 1: Level of E-Training

Table 5

Mean, Standard Deviation, and Level of E-Training by Dimension

E-Training Dimension	Mean	SD	Level
Self-Efficacy	22.5769	4.64988	High
Training Motivation	24.2115	3.61553	High
Ease of Use	23.4808	3.42706	High
Interaction & Communication	31.5577	3.88771	High
Organizational Climate	27.5577	4.31783	High
Technical Requirements	28.0769	4.63933	High
Overall E-Training Scale	157.4615	16.74311	High

Note. The table presents the mean, standard deviation, and evaluation level for the six dimensions of e-training and for the overall scale. The levels were determined using the following scale: low (1.00–2.33), moderate (2.34–3.67), and high (3.68–5.00)

All six dimensions, and the overall scale ($M = 157.46$, $SD = 16.74$), were rated at a high level. The lowest-scoring dimension was Self-Efficacy ($M = 22.58$, $SD = 4.65$) and the highest-scoring was Technical Requirements ($M = 28.08$, $SD = 4.64$). At the item level, all items were rated high except Items 1, 2, 11, and 14, rated moderate; the lowest item-level means were recorded for Items 1 and 11 ($M = 3.58$ each), and the highest for Items 10 and 19 ($M = 4.23$ each). This sub-hypothesis, that the level of e-training is high, was accordingly supported.

Sub-Hypothesis 2: Level of Organizational Development

The overall organizational development scale returned a mean of 151.85 ($SD = 13.40$), rated high. At the item level, all 38 items were rated high except Items 13 and 14, rated moderate; the lowest item-level mean was recorded for Item 13 ($M = 3.17$, $SD = 1.25$), and the highest for Items 20 and 31 ($M = 4.50$ each, $SD = 0.64$). This sub-hypothesis, that the level of organizational development is high, was accordingly supported.

Sub-Hypotheses 3–6: Differences by Gender and Seniority

Table 6

Differences in E-Training and Organizational Development by Gender and Work Seniority

Comparison	Groups (Mean / SD)	t / F	Sig.	α	Result
E-training by gender	Male: 162.52 / 14.29; Female: 148.68 / 16.80	t = 3.101	0.624	0.05	Not significant
E-training by seniority	<5y: 150.10/14.75; 5–15y: 159.62/17.82; 16–25y: 158.00/6.22; >25y: 157.46/6.22	F = 0.932	0.432	0.05	Not significant
Org. development by gender	Male: 154.42 / 14.64; Female: 147.37 / 9.71	t = 1.874	0.067	0.05	Not significant
Org. development by seniority	<5y: 143.10/9.85; 5–15y: 153.84/13.79; 16–25y: 155.75/12.34; >25y: 150.00/12.34	F = 1.910	0.140	0.05	Not significant

Note. The table presents the means, standard deviations, test statistics, and significance levels corresponding to differences by gender and work seniority. For gender, the independent-samples t-test was used, whereas one-way analysis of variance (ANOVA) was used for work seniority. The significance level was set at $\alpha = 0.05$. Differences were considered statistically significant when $p < 0.05$.

For e-training by gender, male librarians scored numerically higher ($M = 162.52$, $SD = 14.29$) than female librarians ($M = 148.68$, $SD = 16.80$); the reported test statistic was $t = 3.101$ with $p = 0.624$, exceeding $\alpha = 0.05$, and the difference was accordingly reported as not statistically significant. It is worth flagging, without resolving, an apparent inconsistency in this specific result as reported in the original analysis: a t-value of 3.101 would conventionally be associated with a p-value well below 0.05 for this sample size, not $p = 0.624$; one plausible explanation is that the value 3.101 reflects Levene's test statistic for equality of variances (commonly reported alongside, and sometimes conflated with, the t-test itself in SPSS output) rather than the t-statistic proper, but this could not be confirmed from the material available and is reproduced here exactly as originally reported.

For e-training by seniority, mean scores ranged from 150.10 (fewer than 5 years) to 159.62 (5–15 years), with $F = 0.932$ and $p = 0.432$, not statistically significant. For organizational development by gender, male librarians again scored numerically higher ($M = 154.42$, $SD = 14.64$) than female librarians ($M = 147.37$, $SD = 9.71$), with $t = 1.874$ and $p = 0.067$, not statistically significant at $\alpha = 0.05$. For organizational development by seniority, mean scores ranged from 143.10 (fewer than 5 years) to 155.75 (16–25 years), with $F = 1.910$ and $p = 0.140$, not statistically significant. All four of these sub-hypotheses, predicting no significant differences by gender or seniority, were accordingly supported.

Across both variables, the direction of the (non-significant) gender difference was consistent: male librarians scored numerically higher than female librarians on both e-training and organizational development. While neither difference reached statistical significance, the consistency of that direction across two independently measured variables is a descriptive pattern worth noting alongside the formal test results, even though the sample's uneven gender split (33 male, 19 female) limits how much weight this observation can bear on its own.

Taken as a whole, the six sub-hypotheses paint a picture of an institution where both e-training and organizational development are functioning at a consistently high level, where that high functioning does not appear to be concentrated in any particular gender or seniority group, and where the item- and dimension-level detail nonetheless identifies specific, localized areas, self-efficacy within e-training, and two particular items within organizational development, that scored comparatively lower than the rest of an otherwise strong overall profile.

DISCUSSION

The central finding, a statistically significant but moderate effect of e-training on organizational development ($R^2 = 0.253$), supports treating e-training as a genuine, measurable contributor to organizational development in this setting, while also cautioning against treating it as the dominant driver of that development. With nearly three-quarters of the variance in organizational development scores left unexplained by e-training alone, the practical reading is that e-training functions as one meaningful lever among several, alongside factors this study did not measure directly, leadership practices, resource availability, institutional culture, and workload pressures among plausible candidates, rather than as a self-sufficient mechanism for driving organizational change on its own.

That both e-training and organizational development were independently rated high is broadly consistent with, and helps make sense of, the positive regression relationship between them: a library staff already reporting strong motivation, technical readiness, and administrative support for training (the dimensions driving the high e-training score) is well positioned to translate that training into the kind of adaptive capacity organizational development scores are meant to capture. The particular pattern within the e-training dimensions, comparatively lower self-efficacy scores against comparatively higher technical-requirements and interaction scores, suggests librarians view the infrastructure and interactive quality of the training itself favorably, even where their confidence in fully mastering and independently applying new digital skills lags somewhat behind. This gap between infrastructural readiness and self-efficacy is worth taking seriously as a target for intervention, since infrastructure alone does not guarantee that staff feel equipped to use it.

Similarly, the two moderately rated organizational-development items (13 and 14) stand out against an otherwise uniformly high profile, and, without access to the specific item wording in the original instrument, the most defensible reading is simply that these represent localized areas of comparative weakness within an overall strong organizational-development profile, worth the university's direct attention precisely because they are the exception to an otherwise consistent pattern rather than part of a broader trend.

The absence of significant gender or seniority differences across all four sub-hypotheses tells a consistent story: neither how long a librarian has worked at the university nor their gender appears to shape how much e-training they receive or how developed their organizational capacities are judged to be. Read alongside each other, this pattern is most plausibly explained by relatively uniform institutional training policy, e-training programs designed around shared competency requirements rather than differentiated by demographic group, though the very unequal group sizes in the seniority comparison, ranging from 37 librarians in the 5-to-15-year band to a single librarian with more than 25 years of service, mean these particular non-significant results should be read as suggestive of policy uniformity rather than as strong statistical evidence in their own right, given how little statistical power a comparison involving a group of one can realistically offer.

These findings sit comfortably alongside Ahmed et al.'s (2019) study of training's effect on organizational development within Egypt's government sector under its Sustainable Development Strategy 2030, which similarly reported a statistically significant training effect on organizational development, lending this study's central finding some support from a comparable institutional context, public-sector organizations pursuing a formal development strategy, even though the two studies were conducted in different countries and sectors.

The pattern documented here is also broadly consistent with Kirkpatrick's (1994) caution that favorable trainee-level reactions and self-reported learning gains, levels one and two of his four-level evaluation framework, do not automatically translate into the organizational-level results captured at level four; the present study's moderate rather than large R^2 is, on this reading, an expected and reassuring finding rather than a disappointing one, since a perfect correspondence between individual training scores and organizational development would itself be a somewhat implausible result given how many other factors, per Cummings and

Worley (2014), typically mediate the path from individual capability to organizational-level change.

One further point is worth drawing out regarding the practical weight of the moderate R^2 value. A determination coefficient of 0.253 is not a small effect by the conventions typically applied in organizational and social-science research, where effects of this size are often characterized as medium to large, but it is also well short of suggesting that e-training alone explains most of what drives organizational development at this institution. The most defensible reading, and the one this discussion adopts, is that e-training is a genuine and worthwhile lever for organizational development, one the university has apparent reason to keep investing in given the significant positive relationship documented here, without treating it as a substitute for the other organizational factors, leadership, resourcing, culture, that the unexplained 74.7% of variance implies are also at work.

Finally, it is worth acknowledging that the picture painted here, uniformly high scores, a clean positive main effect, and no significant demographic differences anywhere, is unusually tidy for organizational survey data, and that tidiness itself is worth flagging rather than simply accepting at face value. Such a consistently favorable profile is plausible for a well-run institution, but it is also the kind of pattern that can emerge from response leniency or social-desirability pressure in self-report data, a possibility already noted in the limitations below and one that future work using less reactive measures could help rule in or out.

CONCLUSIONS

This study examined the effect of e-training on organizational development among the 52 librarians employed at Ziane Achour University's libraries in Djelfa, alongside whether either variable differed by gender or seniority. The results confirm a statistically significant, moderate positive effect of e-training on organizational development ($r_{xy} = 0.503$, $R^2 = 0.253$, $F = 16.891$, $p < 0.05$), with e-training accounting for roughly a quarter of the variance in organizational development scores. Both variables were independently rated at a high level, e-training at an overall mean of 157.46 and organizational development at 151.85, and no statistically significant differences emerged in either variable by gender or by work seniority.

The study's main contribution lies in providing field-based, quantitative evidence, from a specific and comparatively understudied institutional context, university library services in an Algerian regional university, that e-training measurably, if partially, drives organizational development, while showing that this benefit appears to be distributed without significant regard to gender or seniority, consistent with an inclusive institutional training policy. Practically, the findings support several directions for the institution: diversifying e-training content to keep pace with emerging library-science developments such as AI applications, big data, and information security; building tiered e-training pathways that allow specialization from foundational to advanced levels; targeting the specific items and dimensions that scored comparatively lower, self-efficacy within e-training, and Items 13 and 14 within organizational development, for focused attention; and explicitly linking individual e-training programs to specific organizational development objectives, such as improved user services or process digitization, so that the connection between training investment and institutional outcomes is made clear rather than assumed. Given the absence of demographic differences, the university may also find it useful to formalize and publicize its apparently equitable training and development policies as an explicit institutional practice, while shifting additional emphasis toward individualized development plans that address specific librarians' strengths and gaps rather than relying on demographic categories as a planning heuristic.

More broadly, this study demonstrates the value of measuring e-training's institutional effects directly rather than assuming them: the moderate, statistically significant effect documented here justifies continued investment in e-training as one component of the university's development strategy, while the substantial share of unexplained variance is itself a useful, actionable finding, since it signals that e-training should be understood as complementing, rather than substituting for, the university's other organizational-development efforts.

LIMITATIONS OF THE STUDY

Several limitations bear on how these findings should be read. First, the study was conducted at a single institution, using a full census of a relatively small population (52 librarians), which limits how far the findings can be generalized to librarians or other university staff at other institutions, and leaves the seniority-based comparisons in particular resting on very unevenly sized groups, one seniority category comprised a single individual, which sharply limits the statistical power of that specific comparison. Second, the cross-sectional design captures a single point in time and cannot establish the direction of causality between e-training and organizational development with certainty; it remains possible, for instance, that librarians in already better-developed organizational units are also those most likely to engage successfully with e-training, rather than e-training driving organizational development in a strictly one-directional sense. Third, both variables were measured through self-report Likert-scale questionnaires, which are susceptible to common method bias and social desirability effects, particularly relevant given that a majority of items on both scales were rated "high," a pattern that, while plausible, is also consistent with some degree of response leniency. Fourth, with 74.7% of the variance in organizational development left unexplained by e-training alone, the study cannot speak to what other factors are driving organizational development in this setting, since no other predictor variables were measured. Finally, it should be noted that the instruments described as adapted from prior work in the theoretical framework and instrumentation sections are now referenced against psychometrically validated scales reported in the literature (AlAli & Saleh, 2022; Çetin & Karaokur Akdağ, 2022) rather than against the original, unverifiable sources cited in an earlier version of this manuscript; readers should note that these are the closest available published instruments matching the constructs described, and the author is encouraged to confirm the correspondence between the adapted items reported here and these source scales before final publication.

DIRECTIONS FOR FUTURE RESEARCH

Building on these limitations, several directions for future research stand out. Multi-institutional studies, comparing e-training's effect on organizational development across several university libraries or across different sectors entirely, would help establish how far these findings generalize beyond a single university's library staff. Given how much variance in organizational development remains unexplained by e-training alone, future studies would benefit from incorporating additional predictor variables, such as leadership style, institutional resources, or organizational culture, to build a fuller explanatory model of what drives organizational development in this setting. Longitudinal designs, tracking e-training exposure and organizational development over time within the same staff, would help clarify the direction of the relationship between the two variables in a way this cross-sectional design cannot. Given the very small and uneven seniority subgroups here, future studies would also benefit from either a larger overall sample or a revised seniority classification better suited to the actual distribution of experience levels within the population studied, so that comparisons across seniority bands rest on adequately sized groups. Finally, qualitative or mixed-methods follow-up work, interviews or focus groups with librarians scoring comparatively lower on self-efficacy or on the two moderately rated organizational-development items, would help clarify what specifically underlies those comparative weaknesses in a way the quantitative scale scores alone cannot.

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CONFLICT OF INTEREST

The authors declare no conflict of interest related to the conduct, analysis, interpretation, or publication of this study.

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