

Training and Pedagogical Use of Digital Technologies by Languages Teachers in Brazil

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Abstract

This study describes professional development and the pedagogical use of digital technologies among teachers in the Languages curriculum area in Brazil. A quantitative documentary analysis of the official ICT in Education 2024 tables was conducted, selecting nine indicators and 29 estimates regarding training, pedagogical practices, barriers, and training contents. Survey denominators and sampling error margins were preserved; 95% confidence intervals were derived from the published estimates and margins. Continuing professional development in the 12 months prior to the interview reached 46.1% of Languages teachers (95% CI 35.9–56.3), while independent learning was reported by 93.9% (90.0–97.8). The use of technologies for lesson preparation reached 99.1% (97.8–100.0). Conversely, 53.9% never asked students to write texts for a website, blog, newspaper, or magazine, and 55.7% never requested podcasts or online radio content. Insufficient computers and tablets posed a major barrier to pedagogical use for 56.7% (46.2–67.2). Among participants in continuing professional development, 76.3% evaluated that it strongly contributed to new methodologies. The results characterize heterogeneous practices and suggest coordinating training opportunities, technical support, and material conditions. The Languages domain does not exclusively identify language teachers, and the aggregated data do not allow estimating individual or causal effects of professional development.

1 Introduction

Digital technologies integrate reading, writing, and communication practices that go beyond the operational mastery of equipment. In language education, their relevance involves the ways of producing meanings, participating in public spaces, and recognizing different cultural repertoires. Hafner, Chik, and Jones (Hafner et al. 2015) situate digital literacies within this set of practices, including learning contexts that are not restricted to the classroom. Thus, knowing the presence of devices is necessary, but insufficient to understand the pedagogical work carried out with them.

The distinction between technical availability and pedagogical integration has a trajectory in Applied Linguistics. Bax (Bax 2003) proposes normalization as the horizon in which technology integrates into educational activity without becoming its core. This perspective makes it possible to formulate a still pertinent question: in which situations do digital resources support teaching objectives and in which do they merely accompany pre-established practices? The answer requires examining concrete uses, training, and institutional conditions, without assuming that every adoption represents innovation or that the absence of a tool indicates, by itself, teacher inadequacy.

Tour's study (Tour 2015), with three language teachers, shows that their conceptions of technology affordances shape the organization of personal and professional uses. This qualitative result does not offer a national estimate, but helps interpret why everyday familiarity and pedagogical appropriation are not equivalent measures. More recently, Kern (Kern 2024) reaffirms the centrality of human mediation and critical engagement when discussing new technologies, including artificial intelligence, in language education. The expansion of tools renews the need for grounded pedagogical choices.

The ICT in Education 2024 survey provides national indicators on digital practices and teacher professional development (Núcleo de Informação e Coordenação do Ponto BR 2025). Its tables make it possible to observe the Languages curriculum domain, though not to separate, at this level of disclosure, teachers of Portuguese, indigenous languages, and foreign languages from other components included in the area. This paper takes the published domain as its own empirical object. Its approximation to language education is theoretical and curricular; it does not transform a broad category into an exclusive sample of language teachers.

The research question is: how are training opportunities, digital pedagogical practices, and reported barriers distributed among Languages teachers represented in ICT in Education 2024? The general objective is to describe these dimensions while preserving estimation uncertainty. Specifically, we examine modalities of teacher learning, contrasts between lesson preparation and student digital production, perceived difficulties, and the contents of continuing professional development. The national set of teachers functions as a contextual reference, not as an independent control group.

The contribution lies in bridging public indicators with the discussion on digital literacies, with a transparent statistical delimitation. Rather than attributing causes to aggregated differences, the study identifies aspects that deserve subsequent investigation and makes explicit what the data allow to state. This strategy also offers a starting point for specific research on language education, including qualitative studies, without extrapolating current results to adult learners or modalities not identified in the sample cut.

2 Digital Literacies and Teacher Education

An approach centered on digital literacies shifts the question from the tool utilized to the social practices it enables. Producing a text for public circulation, evaluating information, and combining image, sound, and writing involve purposes, interlocutors, and criteria of relevance. These tasks are not interchangeable with simple exposure to digital content. In this article, technological indicators are treated as partial signals of these practices, rather than as a validated scale of literacy, critical competence, or teaching quality.

In Portuguese language teaching, Oliveira and Silva (Oliveira and Silva 2020) discuss digital textual genres and suggest digital narratives and micro-literature as pedagogical possibilities. Their contribution is pertinent because it links technological use to forms of textual expression and circulation. However, a survey question about asking students to write texts for a website, blog, newspaper, or magazine does not reveal the genre produced, the effective audience, writing quality, or student engagement. The indicator measures the declared frequency of a request, leaving those properties open to investigation.

Nor should professional development be reduced to an isolated event. Learning from colleagues, consulting tutorials, taking undergraduate courses, and participating in continuing education activities correspond to distinct experiences. Conceptually, they can be complementary; statistically, they do not constitute mutually exclusive categories. The same individual can mobilize all these possibilities.

Analysis must therefore preserve the meaning of each question, avoiding summing percentages across different learning modalities or interpreting their coexistence as demonstrated substitution.

Tagata and Ribas (Tagata and Ribas 2021) problematize relations among literacy, society, technology, and education under conditions of uncertainty. Their argument helps avoid an exclusively instrumental reading of digital practices. The evaluation of such practices must consider social experiences and issues of participation, rather than merely targets of resource incorporation. For the present study, this means recognizing that a high frequency of use does not, by itself, resolve questions of inclusion, authorship, and criticality.

Souza (Souza 2022) narratively examines games, digital technologies, and inclusion in the English language curriculum based on an experience involving visual impairment. The work highlights the importance of conditions for participation and situated methodological choices. This perspective prevents interpreting the mere execution of a digital activity as automatic evidence of inclusion. In the data analyzed here, it is likewise impossible to observe intercultural negotiation during interaction episodes, recognize constraints, or evaluate whether students' diverse repertoires were welcomed.

The articulation of these references guides four empirical dimensions: teacher learning and training; preparation, evaluation, and student production practices; perceived institutional obstacles; and declared contents and contributions of training. This separation serves an analytical purpose and does not assume independence among dimensions. Infrastructure, professional support, and pedagogical choices may interact, but the descriptive design does not estimate such interaction. Literature helps formulate interpretations and subsequent questions; it does not fill missing relations in the tables nor authorize attributing unobserved motivations to respondents.

3 Methodological Procedures

This is a quantitative, documentary, cross-sectional, and descriptive research based on the ICT in Education 2024 teacher tables, version 1.0 (Núcleo de Informação e Coordenação do Ponto BR 2025). We examined the documentation package, the variable dictionary, the questionnaire, and four official spreadsheets: proportions, estimated population totals, and respective margins of error. The inventory of files did not identify individual records. The unit of analysis in this paper is the published estimate for a disclosure domain; synthetic teacher observations were not constructed.

The original survey employed probabilistic sampling and weighting procedures, non-response correction, and calibration. Variance estimation took the sample design into account using the primary PSU (primary sampling unit) method (Comitê Gestor da Internet no Brasil 2025b). Data collection took place between August 2024 and March 2025 and included 1,462 responding teachers across 989 schools (Comitê Gestor da Internet no Brasil 2025a). These figures refer to the general sample. The specific sample size for Languages is not reported in the tables used; expanded totals were not treated as counts of respondents.

The main domain was the row “KNOWLEDGE AREA – Languages”, linked to the classification of the most frequently taught component. The research universe refers to regular education; teacher selection covers grades and levels eligible as described in the methodological report. No exclusive estimates were produced for English, Youth and Adult Education (EJA), or adult language education. The Brazil results include the Languages domain and, therefore, do not represent an independent comparison group.

Nine indicators were selected: C1, E1, F3C, H1, H2, H3, H7, H9, and I9_1. Exploratory selection considered correspondence with the four theoretical dimensions and the availability of both proportion and margin of error for the same item. The 29 estimates presented in the tables do not exhaust the tabular plan. For F3C, the categories “always” and “never” were preserved without frequency aggregation; for I9_1, “hampers a lot” was analyzed. H7 and H9 have as their denominator only participants in continuing training in the previous 12 months.

Intervals were calculated as the estimate minus and plus the official 95% margin of error, with bounds restricted to the 0% to 100% range. Disclosures adopt one decimal place. Weights were not reapplied to ready-made estimates, dashes like zero were not recoded, and significance tests, regressions, or causal effects were not calculated. Differences in percentage points are strictly descriptive; the covariance required for inference between estimates is not available.

Bibliographic foundation was directed to relevant texts from selected periodicals without an exhaustive search protocol. Unlike an integrative review, whose object includes the systematized interpretation of a corpus of studies (Rodrigues et al. 2022), the empirical corpus of this work is statistical. Scripts, references, extraction rules, and results are available in the repository indicated at the end. Validation cross-checked labels, proportion and margin cells, and the H3 proportion against its expanded totals, keeping original files intact.

To assist in the preliminary translation of technical terms and the structuring of the English abstract, the large language model Gemini (advanced version, Google LLC) was utilized under the full supervision of the authors.

4 Results and Discussion

4.1 Continuing Professional Development and Everyday Learning

Continuing professional development in the last 12 months was reported by 46.1% of Languages teachers, with a 95% CI of 35.9% to 56.3% (Table 1). The national estimate was 53.5

Teacher Training and Technological Learning

Indicator / response	Languages % [95% CI]	Brazil %
Continuing professional development in the last 12 months	46.1 [35.9; 56.3]	53.5
Course on technologies during undergraduate studies	40.9 [31.1; 50.7]	44.1
Independent learning on one's own	93.9 [90.0; 97.8]	91.8
Online videos or tutorials	87.5 [81.2; 93.8]	90.5
Learning from other teachers	77.6 [70.3; 84.8]	81.0
Government or organizational courses	65.1 [56.4; 73.8]	66.4
Specific computer and Internet courses	47.8 [38.1; 57.6]	53.4
Pedagogical coordinator or principal	51.0 [40.9; 61.1]	51.7

Base: total teachers. H3: last 12 months; H2: undergraduate experience; H1: learning modalities, with overlapping responses. **95% CI:** 95% confidence interval. Brazil includes Languages. **Source:** ICT in Education 2024 (Núcleo de Informação e Coordenação do Ponto BR 2025); authors' calculations.

Independent learning reached 93.9

Having taken a course on technologies during undergraduate studies was reported by 40.9

The descriptive predominance of self-training invites consideration of how peer networks and institutional opportunities can complement each other. In light of Tour (Tour 2015), familiarity and conceptions of technology affordances are part of the training problem. The data, however, do not inform duration, quality, follow-up, or transfer of learning to the classroom. For educational policies, the result supports investigating these conditions rather than replacing structured training with individual updating responsibilities.

4.2 Lesson Preparation and Student Digital Production

The use of technologies to prepare lessons and activities was nearly universal in the Languages domain at 99.1

Preparation, Evaluation, and Student Digital Production

Indicator / response	Languages % [95% CI]	Brazil %
Lesson and activity preparation – yes	99.1 [97.8; 100.0]	98.9
Digital evaluation in the last 12 months – yes	68.1 [59.2; 77.0]	68.8
Texts for website, blog, newspaper, or magazine – always	4.4 [1.0; 7.9]	2.4
Texts for website, blog, newspaper, or magazine – never	53.9 [43.9; 63.9]	59.4
Music, videos, presentations, and images – always	14.5 [7.9; 21.1]	8.8
Music, videos, presentations, and images – never	13.3 [7.9; 18.8]	21.5
Podcast or online radio – always	1.5 [0.1; 2.9]	0.6
Podcast or online radio – never	55.7 [45.6; 65.8]	66.2

Base: total teachers. C1 and E1: affirmative response. F3C: categories “always” and “never”; intermediate frequencies omitted. **95% CI:** 95% confidence interval. Brazil includes Languages. **Source:** ICT in Education 2024 (Núcleo de Informação e Coordenação do Ponto BR 2025); authors’ calculations.

In multimedia production, 14.5

These items also differ in scope: the question on music, videos, presentations, and images bundles several production formats, whereas podcasting or online radio is more specific. Part of the contrast may relate to question wording rather than pedagogical practice alone. No authorship index was constructed, nor were teachers classified as more or less competent based on the adoption of a specific genre.

The analytical interest lies in the gap between resource use in planning and requesting specific student productions. Oliveira and Silva’s discussion of digital genres (Oliveira and Silva 2020) helps frame questions about interlocution, circulation, and the objectives of these activities. The dataset cannot answer whether they were collaborative, accessible, or linguistically challenging. Reported frequency is an entry point to investigate pedagogical design, not a sufficient measure of its quality or learning outcomes.

4.3 Material Obstacles and Professional Support

Insufficient computers and tablets were classified as a major difficulty by 56.7

Factors That Greatly Hinder the Use of Technologies in Classes

Indicator / response	Languages % [95% CI]	Brazil %
Insufficient computers and tablets	56.7 [46.2; 67.2]	53.6
Lack of technical staff	54.2 [44.5; 64.0]	46.9
Absence of digital educational resources	48.7 [38.4; 59.1]	46.9
Low connection speed	46.3 [36.3; 56.2]	49.0
Absence of continuing professional development	44.1 [33.9; 54.4]	41.0
Lack of pedagogical support	21.0 [13.7; 28.2]	19.6

Base: total teachers. I9_1: response “greatly hampers the use of digital technologies in classes”. Non-exclusive responses. **95% CI:** 95% confidence interval. Brazil includes Languages. **Source:** ICT in Education 2024 (Núcleo de Informação e Coordenação do Ponto BR 2025); authors’ calculations.

The absence of continuing professional development greatly hindered use for 44.1

The indicator of training absence as a difficulty is not the complement of participation in training over the past 12 months. The first question requests an evaluation of the obstacle; the second records participation. Teachers who attended activities may still consider them insufficient, but this hypothesis was not tested. Using distinct questions helps describe the problem as long as one does not attribute a combination of responses to the same individuals that aggregated data cannot observe.

The results are compatible with a support agenda that addresses equipment, connectivity, maintenance, and pedagogical development jointly. Bax’s integration perspective (Bax 2003) helps understand why making a tool available is not enough to incorporate it into school life. This approach is interpretive: the survey does not estimate how much resolving each obstacle would increase use, nor which intervention would yield the best outcome.

From the standpoint of language education, it is especially relevant to distinguish the teacher’s capability to prepare materials from each student’s capability to produce and share content. Individual or domestic availability used in planning does not guarantee equivalent collective conditions during class. The survey does not establish this causal chain, but the combination of indicators justifies examining it in studies observing actual activities and resource distribution in schools.

4.4 Training Contents and Perceived Contributions

Among Languages teachers who participated in continuing professional development in the past 12 months, 79.2

Contents and Contributions of Continuing Professional Development

Indicator / response	Languages % [95% CI]	Brazil %
Topic – adapting to learning paces	79.2 [69.0; 89.3]	79.3
Topic – creation of educational content	76.8 [66.3; 87.3]	81.5
Topic – media education and critical use	74.6 [64.9; 84.3]	67.8
Topic – truthfulness and sharing	61.2 [50.2; 72.1]	60.5
Topic – artificial intelligence	59.5 [47.2; 71.9]	59.2
Contributed a lot – new methodologies	76.3 [66.1; 86.5]	76.3
Contributed a lot – critical and responsible use	63.6 [52.7; 74.4]	66.7

Base: only participants in continuing professional development in the last 12 months. H7: covered content; H9: contribution evaluated as “a lot”. **95% CI:** 95% confidence interval. Brazil includes Languages. **Source:** ICT in Education 2024 (Núcleo de Informação e Coordenação do Ponto BR 2025); authors’ calculations.

Information truthfulness and responsible sharing appeared in 61.2

Regarding perceived contributions, 76.3

The presence of media education and artificial intelligence broadens the debate beyond operational training. Kern (Kern 2024) argues for teacher mediation and critical engagement in the face of new tools. Here, this reference helps problematize the content of training opportunities; the percentages do not demonstrate that such orientation materialized. Nor do they authorize inferences about intercultural negotiation, as there is no interaction record allowing examination of that process.

Together, the four dimensions describe a heterogeneous situation: widespread everyday learning and digital preparation coexist with less comprehensive recent training, varying frequencies of student production, and significant institutional obstacles. “Coexist”, in this design, means appearing within estimates of the same domain. It does not mean the same combination is present in all teachers, nor that one dimension statistically explains another.

5 Limitations and Implications for Future Research

The first limitation is the curricular cutout. Languages covers more than language teachers, and its heterogeneity can influence results. Percentages do not characterize specific components, adult education, or EJA. Investigating these fields requires appropriate populations and instruments.

The second limitation concerns granularity. Without individual records, relationships between training and use within the domain cannot be examined, nor can age, region, school network, or infrastructure be controlled, ruling out multivariate models. National cuts by these characteristics, documented in

supplementary material, were not attributed to Languages teachers. This avoids transforming differences among aggregated groups into explanations of individual behaviors.

The third limitation involves measurement and precision. Responses are self-reports, subject to question interpretation and recall of considered periods. Recent training, undergraduate experiences, and everyday learning have distinct timeframes. Indicators do not directly measure pedagogical quality, criticality, inclusion, or student learning. Margins of error delimit sampling uncertainty but do not automatically incorporate all sources of error. The width of various intervals also counsels against conclusions based on small differences.

The nine indicators were chosen exploratorily based on thematic relevance after auditing files, without pre-registration. The analysis does not cover all 67 published indicators nor constitute an exhaustive literature review. Origin cells allow reviewing choices and contrasting them with other cuts.

Institutional access to microdata would allow defining language teachers through subject-matter variables. The analysis would need to incorporate sample design, verify effective domain size, and evaluate model stability. Qualitative studies could track digital tasks, textual circulation, and teacher decisions, preserving each method's evidence unit.

6 Final Remarks

The ICT in Education 2024 tables describe, for Languages, widespread everyday technological learning and nearly universal use in lesson preparation, alongside continuing training coverage estimated at 46.1

The central implication is to consider professional learning opportunities alongside student participation conditions, technical support, and pedagogical choices. The argument is not to recommend indiscriminate tool adoption, but to investigate how resources meet educational goals in each context. The study's contribution is to offer an auditable descriptive portrait and delimited questions for investigation, without confusing technological frequency with critical literacy or inclusion.

Declarations

Data and Code Availability:

Public sources, scripts, and derived tables are documented in the public GitHub repository for scientific reproducibility (Carvalho Souza 2026). The analysis exclusively utilized published aggregated results, without identification of or contact with participants.

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