

RESEARCH ARTICLE

Inclusive Digital Learning Design for Italian as a Foreign Language: Co-Teaching, Assistive Technology, and Multimodal Participation

Kleanthi Santamouri¹, Christos Douvlos¹, Panagiotis Toumpos¹, Alexandros Gazis², Maria Coroli¹, Argyro Apostolidou³

¹Ministry of Education and Religious Affairs, Directorate of Primary Education, 10438 Athens, Greece.

²Heriot-Watt University, Edinburgh EH14 4AS, United Kingdom.

³School of Italian Language and Literature, Aristotle University of Thessaloniki, 54124 Thessaloniki, Greece.

Received: 18 September 2026 Accepted: 05 October 2026 Published: 20 October 2026

Corresponding Author: Alexandros Gazis, Heriot-Watt University, Edinburgh EH14 4AS, United Kingdom.

Abstract

Foreign-language classrooms make learner variability highly visible because listening, speaking, reading, writing, interaction, memory, and cultural interpretation are demanded simultaneously. This conceptual design article develops an inclusive model for teaching Italian as a foreign language at CEFR A1–A2 through digital co-teaching and assistive technology. The design brings together evidence on co-teaching, assistive technology, rights-based inclusion, and language-learning design, and extends this base with recent research on disability, mobile learning, artificial intelligence, multimodal assessment, and accessible technology. The ITALIAN-ACCESS framework is organized around seven design commitments, summarized by the mnemonic ITALIAN: Inclusive target; Two-educator role map; Accessible input; Learner choice; Interaction and rehearsal; Assessment triangulation; and Navigation, ethics, continuity, and support. The term ACCESS highlights the framework's overall emphasis on accessible participation. A twelve-lesson scenario moves from identity and classroom language to everyday transactions, directions, short narratives, and an accessible digital city guide. Four tables compare co-teaching configurations, match barriers to supports, map the lesson sequence, and define an evidence plan. The design treats artificial intelligence as an optional, supervised support rather than an autonomous tutor or assessor. It offers a reusable framework for inclusive Italian-language provision and a basis for future mixed-method evaluation.

Keywords: Italian as a Foreign Language, Inclusive Language Education, Digital Co-Teaching, Assistive Technology, CEFR, Mobile-Assisted Language Learning.

1. Introduction

The act of learning Italian as a foreign language is the coordinated use of a very wide variety of skills. The skills which will be used include: perception, memory, attention, pronunciation, lexical retrieval, grammatical patterning, interaction, reading and writing. In a normal lesson, learners may be called to listen to a sound sequence they do not know, locate its written form, interpret it, react to it quickly, and put up with public correction, all at the same time.

Environmental barriers are now highly visible. Students with dyslexia, hearing loss, attention differences, intellectual disabilities, anxiety, motor access needs, or an emerging language of the schooling may confront different points of difficulty, despite having the same communicative aim, [1], [2], [3], [4], [5], [6], [7], [8], [9], [10], [11].

It therefore cannot mean accessing a simplified task placed on the sidelines. To successfully learn a language, one must be engaged in meaningful

Citation: Kleanthi Santamouri, Christos Douvlos, Panagiotis Toumpos, *et al.* Inclusive Digital Learning Design for Italian as a Foreign Language: Co-Teaching, Assistive Technology, and Multimodal Participation. Journal of Educational System. 2026; 8(1): 09-19.

©The Author(s) 2026. This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

communication, have authentic membership in the community, and possess multiple channels to take in information [12], [13], [14].

Recent co-teaching literature supports a flexible approach in which shared planning, clear roles, and different co-teaching configurations are adapted to learner needs rather than used as fixed routines, [15], [16]. It is not so much the case of every learner doing the same, but that differences stay aligned with a shared worthwhile language outcome.

The combination of domain expertise with technological expertise enables the instruction to take place against the backdrop of the subject being taught. More recent studies suggest that collaboration can facilitate literacy, flexible grouping, specialist strategy instruction, and responsive interaction in the classroom. However, without shared planning and balanced instructional authority, co-teaching can reproduce a lead-teacher/helper hierarchy. Adding a digital layer entails captioning, audio replay, multimodal composition, mobile practice, and alternative access but brings with it distraction, inequity, surveillance, and dependence on automated feedback [17], [18], [19], [20], [21], [22], [23], [24], [25], [26], [27], [28], [29], [30], [31].

This paper presents a self-contained design for inclusive Italian at CEFR A1-A2. It brings together evidence on co-teaching, assistive technology, rights-based inclusion, and language-learning design, and combines these strands with recent international research. This is the ITALIAN-ACCESS framework and a 12-lesson scenario, leading to an accessible digital city guide. The four tables summarize co-teaching configurations, barrier-support matching, the twelve-lesson sequence, and the assessment plan. The design is conceptual: it proposes a hypothesis for implementation that is backed by research, not evidence that the result of the full program is already established.

2. Conceptual and Evidence Base

The framework brings together four areas that are relevant to inclusive foreign-language teaching: co-teaching, assistive technology, rights-based inclusion, and language-learning design. Research on co-teaching emphasizes shared responsibility, planned roles, flexible grouping, and regular review of how the two educators work together [12], [13], [14], [15], [16]. These principles are particularly relevant to beginner language learning, where pronunciation,

literacy, interaction, and access needs may change within the same lesson.

Assistive technology is considered in terms of the function it serves rather than the learner's diagnosis. The aim is to support access to input, communication, participation, and independent work while keeping the language task itself meaningful. This approach is consistent with recent reviews of technology and assistive support in inclusive education [29], [30], [31].

Italian-language studies provide useful context for the use of digital tools in language learning and for activities that connect Italian with everyday and tourism-related communication [32], [33]. These studies are used as contextual examples rather than as direct evidence that a particular technology improves inclusion.

The CEFR Companion Volume provides the action-oriented basis for the language objectives and for considering reception, production, interaction, and mediation as related areas of communicative performance [34]. The rights-based perspective is informed by the Convention on the Rights of Persons with Disabilities and its emphasis on inclusive education, reasonable accommodation, and participation [35]. Universal Design for Learning adds a proactive design perspective by encouraging multiple ways of accessing information, communicating, and participating [36].

Taken together, these sources support a conceptual synthesis rather than a systematic review or an effectiveness study. Evidence from English and other additional-language contexts is used to inform design choices, but it is not treated as automatically equivalent to Italian-language learning. The framework therefore proposes a set of design choices and implementation conditions that can be examined in future classroom research.

3. Learner Variability in Italian A1–A2

Beginners on the A1 and A2 levels need high-frequency language items to discuss classroom interaction, identity, family, time, food, shopping, directions, leisure and the simple past. To initiate or sustain a brief exchange, learners will have to develop meaningful sound–spelling connections, basic vocabulary, formulaic sequences, grammar patterns, and pragmatic routines. As per CEFR descriptors, what a learner can do in communication is the priority, and they allow the reception, production, interaction, and mediation to be evidenced through different tasks

[34]. This position takes action and advocates for an inclusive design that uses language with intent.

Learning difficulties can affect the processing of sounds, working memory, making lists, automatization, reading, spelling, and getting back information within a set time. In Italian, relatively clear connections between graphemes and phonemes can assist in decoding, but these connections don't ease challenges with speed, morphology, vocabulary, or written production. Latest synthesis suggests explicit teaching of structure, cumulative practice, multimodal presentation, manageable pace, and assessment that disentangles the intended language construct from transcribing and memory load [1]. It is inadvisable to withhold explicit support with literacy for multilingual learners; the evidence shows.

D/deaf and hard-of-hearing learners may require accurate captions, monitoring of speech production, written preview, sign-language or other communication support, less auditory competition, and direct access to turn-taking. Latest studies focus on different strategies and learner perspectives instead of the earlier assumed single visual learning style [4], [7], [11]. If captions are poorly synchronized, or if they provide a lot of text simultaneously for the whole class, attention may get divided. The co-teaching couple must experiment with the coordination of sound, face visibility, text, and interaction.

Students who have mild intellectual disabilities can benefit from concrete contexts, stabilized routines, repetition of models, reduced linguistic density, and immediate use of language in a meaningful action [9]. Students who experience attention differences may benefit from shorter cycles, explicit transitions, choice, movement, and less cluttered digital interfaces, although a recent review notes substantial variation in study quality and transfer [27]. Following adaptations ought to change the amount and representation of support and should not take the learner out of communication or permanently limit them to isolated vocabulary drills.

Individual and environmental factors influence motivation and anxiety. Evidence from other countries suggests that supportive learning conditions may be as important as internal motivation for diverse learners [3], [5]. Project work and accessible literature may enlarge participation through private rehearsal. Low-stakes multimodal production may enlarge participation [5]. Experiencing virtual environments can impact communicative confidence and perceived

fluency, although conclusions about causation and transfer should be drawn cautiously [28]. The design changes from predictable, scaffolding encounters to progressively less scripted interaction.

It is not acceptable for the learning culture to be dependent on mediation. Contemporary Italian voices, places, everyday practices, and regional variation should be encountered by beginners. No one accent, family structure, or lifestyle should be presented as 'the norm'. Images are described, audio has transcripts, cultural assumptions are explained (rather than tested) as background knowledge, and students can compare practices through speech, text, symbol, or curated media. According to [34], mediation assignments - explaining a menu item, summarizing a notice, helping a peer follow instructions - allow learners to add meaning that, at that moment, is beyond their productive language repertoire.

4. Inclusive Co-Teaching for the Italian Classroom

When selecting a co-teaching model, the co-teaching pair should begin with a shared communicative intention. When the aim is to greet and share personal data, parallel groups can enhance the speaking turns. If we want to really differentiate sounds and spellings, we can combine some explicit modeling with supported listening and either tactile or digital word-making. A one-teach/one-observe is appropriate for a brief interval if evidence is needed about response latency or caption use. The co-teaching configuration should therefore be selected in response to the intended learning interaction.

The strategy of one-teach/one-assist has a narrow but useful purpose when it is one student's first access to a platform or a new communication board, or the first time the student is using an unfamiliar response method.

It must not become the standard engagement whereby one teacher possesses Italian and the other rotates amongst recognized students. It is necessary for both educators to have visible authority in the target language and in decisions about accessibility. Recent co-teaching research emphasizes shared planning, clear roles, flexible use of co-teaching models, and joint reflection on outcomes [12], [13], [14], [15], [16].

Station teaching is particularly useful because beginners' language learning benefits from opportunities to encounter the same function in different modes. An example of a lesson on ordering

food could include a teacher dialogue station, menu-reading station (with text-to-speech and enlarged print), role-play, or audio-recording station. The input, the size of the group, and the route of the response all vary. In light of recent evidence from collaborative mobile learning studies, having students' roles, accountability, and educational purpose clearly defined is crucial to structured peer work [19].

Alternative teaching provides opportunities for a delayed preview of the pronunciation, retrieval of vocabulary, extension or re-teaching. The membership of the small group should change, the work should reconnect to the shared task, and the smaller group should not be left with a permanently reduced curriculum. When the educators model an exchange, contrast a formal and informal address, demonstrate repair strategies, or think aloud about a cultural text,

this is useful. A case study from an Italian primary classroom presents evidence that collaboration practice is shaped by sociocultural routines [13]. Moreover, training that addresses interaction is required, not only model labels.

Table 1 maps six co-teaching configurations to Italian-language tasks, digital or assistive options, and inclusion safeguards. As such, Table 1 should be treated as an aid for planning and not for ranking. According to research, co-teaching models are organised because of roles, structures in class, and the response of the learners, which are effective. Consequently, both may modify their configuration within the one lesson: team modelling an exchange, switching to parallel rehearsal, before concluding with one educator leading the reflection and the other documenting the evidence.

Table 1. *Co-teaching configurations for Italian A1–A2.*

Configuration	Illustrative Italian task	Digital or assistive option	Inclusion safeguard
One teach—one observe	Greeting and repair-language exchange	Structured observation form; caption-use check	Observe a defined interaction briefly; review evidence jointly
One teach—one assist.	First use of a dialogue board or platform	Navigation prompt, AAC setup, accessible file	Time-limit assistance and rotate visible teaching authority
Station teaching	Ordering food in a cafe	Audio menu, readable menu, role-play recording	One functional outcome and equal-status routes at every station
Parallel teaching	Asking and giving directions	Large-print/tactile or digital map	Flexible groups; equivalent vocabulary and cognitive demand
Alternative teaching	Pronunciation preview or vocabulary retrieval	Slow replay, visual stress cue, private practice	Temporary membership and rapid reconnection to common task
Team teaching	Modeling formal and informal dialogue	Shared screen, live captions, color-coded turns	Complementary roles and accessible pacing, not improvised performance

5. Multimodal and Assistive Language Supports

This Italian input set should consist of easily heard, seen, read, and experienced modes with replays of the essential images. However, not all modes should be presented at full density. Educators can preview a few key vocabulary words, highlight stress and relevant morphological patterns visually, and provide an uncluttered recording with a transcript. The benefits of technology should not make us forget other ways of achieving goals in language learning. A systematic review of mobile-assisted pronunciation learning reports generally positive effects, while also showing substantial variation in study design and outcome measures [18].

The design of reading materials must incorporate headings, short sections, spacing, stable navigation, and readable text. A screen reader or TTS must

pronounce Italian reasonably well and expose reading order; nor is an image-only worksheet accessible just because it has been uploaded. Editable principles can cut down syntactic density not required and retain age-respecting content [8]. Pupils may use line focus; enlarged display; bilingual glossary; symbol support; or colour cues, except that visual marking does not become their second code which they must remember.

Ways of writing and interacting that are legitimate include handwriting, keyboard, alternative keyboard, speech input, word prediction, audio response, captioned video, communication board, or teacher-supported scribing (where the intended construct is oral language). Deaf learners can develop writing more efficiently through explicit and accessible instruction than through lowered expectations. Assistive-technology reviews highlight the need to match functions to learner needs, provide user training, and

evaluate whether a tool actually increases independent participation [29], [30], [31].

AI has the potential to carry out controlled practice, simulate dialogues, suggest pronunciation comparisons, and provide feedback suggestions. Yet, it takes place under supervision and is not a prerequisite. AI can support controlled practice, dialogue rehearsal, and feedback, but it should remain optional and teacher-supervised. Recent literature reports both potential benefits and concerns related to reliability, bias, privacy, equitable access, and over-reliance [17], [21], [22], [23], [24], [25], [26]. In this framework, AI is not used to infer disability or emotion and does not make final grading decisions.

The types of support are categorized by barrier, Italian task, and review criterion (see Table 2). The most essential principle is minimum effective technology. A small amount of printed dialogue strip is preferable to none if it means being able to engage with less effort. If a high technology tool permits access that

would not otherwise be available, it is justified. Things should be available at all times and be expressible at the individual level. With the replay, transcript, visual agenda and choice of response available to all, personal settings and specialist devices are confidential and in control of the user [17], [29], [36].

When mobile learning is done with the pedagogical intent of moving across contexts, only then does learning benefit maximally. A student could look at a short interaction at school, rehearse with downloadable audio during supported study time, photograph a public Italian word with permission, and return to class to mediate its meaning. For an effective activity, the purpose should be clear, require minimal data, be easy to use, and must have a non-mobile equivalent that anyone can use. Recent frameworks and collaborative reviews appreciate that it is not device ownership but task structure, social interaction, feedback, and continuity that lead to learning [18], [19], [20].

Table 2. Barrier-support-task matching for inclusive Italian learning.

Barrier	Italian-language demand	Possible support	Functional review
Rapid auditory input	Recognize words and respond	Replay, transcript, captions, visible speaker	Can the learner identify meaning and join the next turn?
Decoding or visual density	Read a short notice or menu	Readable layout, text-to-speech, line focus, glossary	Is access faster and comprehension more independent?
Timed lexical retrieval	Produce a short spoken exchange	Preview, word bank, dialogue frame, rehearsal	Does support increase spontaneous contribution without scripting every turn?
Written or motor output	Compose a message or guide entry	Keyboard route, speech input, word prediction, audio response	Is the intended language construct represented and authorship retained?
Attention and sequencing	Complete a multi-step communicative task	Visual agenda, chunked steps, timer, reduced interface	Are transitions and completion improved with fewer prompts?
Anxiety or public performance	Initiate and repair interaction	Parallel rehearsal, recorded draft, role choice	Does confidence transfer from private practice to meaningful interaction?

6. The ITALIAN-ACCESS Framework and Twelve-Lesson Scenario

ITALIAN-ACCESS identifies seven learning design commitments: Inclusive target; Two-educator role map; Accessible input; Learner choice; Interaction and rehearsal; Assessment triangulation; and Navigation, ethics, continuity and support. A CEFR-related actionable ideal is designed in the framework, and it asks how every learner can enter that action. It then assigns complementary educator roles, prepares accessible input, provides equivalent response routes,

sequences supported interaction, defines evidence, and checks organizational and digital safeguards.

The working scenario assumes a small group of emerging A1 learners studying Italian in two 45-minute lessons per week. The group consists of students with diverse profiles of literacy, attention, hearing, language background, and motor access, without classifying the group by diagnosis. The twelve-lesson outline is suggested and may substitute for older beginners. The lessons show a consistent pattern in terms of components, which are preview

(visual), multimodal model, guided noticing, co-taught rehearsal, task (communicative), brief reflection, and closing (exit evidence).

In the first three lessons of the sequence, identity and involvement are inter-related concepts that must be developed at classroom level. Students use phrases for greeting, introducing and spelling names, stating simple preferences and making classroom repairs (e.g. repeat, clarify). Team modelling makes communication strategies visible, parallel groups increase opportunities to speak, and brief observation intervals help identify which input and response options support participation. The priority is a safe and intelligible exchange in which communication breakdowns can be repaired, rather than flawless production.

Lessons four through six look into families, daily routines, time, food, and ordering. The stations feature a picture-supported vocabulary, short texts, a button for audio replay, role cards, and a café simulation. Flexible alternative teaching allows learners to pre-practice retrieving or pronouncing before rejoining shared role-play. Selecting speech, symbol, text, or AAC communication maintains communicative intent while minimizing access-level distractions for others.

Lessons seven to nine deal with places, directions, shopping, and getting around. Learners read a simple map, ask where a place is, follow simple directional instructions, and complete a transaction. One educator guides an embodied practice in the route while the other educator offers access to the map and documents

communication strategies. It is not required to have a map that is mobile or browser-based; an equivalent route will be a tactile map or large-print map. As such, the sequence ties together digital Italian with concrete tourism activities that have been described in previous Italian-language literature [32], [33].

Through a simple digital city guide, short past narration is introduced in lessons 10-12. Small groups collaborate in the creation of a location entry that consists of a short text in Italian, human-read audio, description of the image, accessibility information, and short dialogue. Learners are empowered to choose the role in which they feel most comfortable (researcher, writer, speaker, editor, access checker, designer) and are not assigned to something that they feel is difficult. The entire sequence, configuration of co-teaching, access route, and evidence product are shown in Table 3.

Between lessons, practice is short and optional. This means that a student may use printed cards, downloaded audio, the school device, and an available browser activity; no essential progress depends on a personal smartphone or family tutoring. The subsequent lesson starts with retrieval in class, so whether they do or do not learn the new content at home does not affect their access. Both educators check out the patterns of completion for infrastructural barriers before interpreting non-completion as a low motivation sign. This continuity rule links equity with hybrid flexibility while keeping the core learning relationship within the supported school programme. A scenario of a twelve-lesson programme is presented in Table 3.

Table 3. *Twelve-lesson inclusive Italian scenario.*

Lessons and function	Language focus	Co-teaching pattern	Accessible evidence product
1–2: Meet and participate	Greetings, name, spelling, repetition, and clarification	Team model; parallel rehearsal	Live, recorded, typed, or AAC-supported introduction
3: Preferences and classroom choices	Mi piace/non mi piace; simple questions	One observe; stations	Choice card plus short exchange and learner reflection
4–5: Family and daily routine	People, present tense, time, sequence	Stations; temporary alternative group	Visual/audio routine with two connected sentences
6: At the cafe	Food, prices, vorrei, polite turn-taking	Team model; parallel role-play	Accessible menu transaction with repair strategy
7–8: City and directions	Places, c'è, dov'è, imperatives/prepositions	Parallel groups; station map work	Route explanation using digital, tactile, or large-print map
9: Shopping and transport	Numbers, tickets, requests, confirmation	Stations; one assist for platform access	Short practical transaction and self-assessment
10: A recent experience	Basic past narrative chunks and sequence words	Alternative preview; team storytelling	Three-event story in text, audio, or captioned video
11–12: Accessible city guide	Integrated A1–A2 mediation and interaction	Team launch; flexible stations; conference	Group location entry with text, verified audio, image description, and dialogue.

7. Assessment and Feedback

The assessment connects to the communicative action and disassociates language evidence from access conditions. An intelligibility task with a relevant vocabulary, along with a simultaneous turn-taking and repair assessment task, could be done without penalising for using a device. A writing task can evaluate meaning and control of language, while recording whether speech input or word prediction was used. CEFR-informed can-do statements render intended actions visible, but these should not be interpreted as a decontextualised checklist but rather alongside work samples and interaction evidence [34].

The duo accumulates the four varieties of evidence: a language output, an organized observation, a learner self-report and a record of assistance. The product evidences what is said, while the observation discloses how this takes place. The self-report identifies confidence, tiredness, and acceptability of the support. The record of support differentiates between a performance by the participant alone and one which occurs with the support having been given by this scaffold. These sources may disagree. It is informative that a learner may know the language but won't speak in public. They can participate confidently while relying on a narrow memorised script.

Table 4 describes assessment moments, criteria, evidence, accessible routes, and decisions. The students engage with rehearsal and exit task in the unit, where performative assessment happens. During the course of the unit, performance of students is shown through the city guide. No single timed test can prove proficiency. The duo evaluates the judgments using collaborative criteria, taking in evidence from reception, production, interaction, and mediation. Learners assess chosen contributions from their portfolios and identify one strategy that aided in communicating.

Table 4. *Triangulated assessment and decision matrix.*

Assessment moment	Criteria	Equivalent evidence routes	Instructional decision
Entry profile	Current can-do actions, access preferences, repair strategies	Brief interaction, reading sample, learner/family report	Select initial supports without fixing ability groups
Guided rehearsal	Meaning, intelligibility, response, use of support	Live observation, audio draft, typed/AAC exchange	Adjust model, pacing, prompt, or input mode
Exit evidence	One lesson-specific communicative action	Oral, written, selected-response plus explanation	Plan retrieval and access for the next lesson
Portfolio review	Growth across reception, production, interaction, mediation	Work sample, recording, transcript, reflection	Identify transfer and one support to retain, fade, or replace

According to a recent meta-analysis, AI-based assessment serves immediate practice or pattern summaries but shows heterogeneity in design, implementation, and effectiveness [21]. Automated pronunciation scores should therefore be interpreted cautiously and should not be treated as equivalent to communicative intelligibility. Feedback that seems plausible linguistically is misdirected instructionally. As a result, teachers verify any product, declare the use of the AI, accept contestation, and do not use an undisclosed score to place, exclude, or infer disability [23], [24], [25], [26].

Feedback is brief, specific, and usable in the next step. One teacher may provide an oral reference while the other offers a model, visual checklist, or audio note. For beginners, corrections prioritize the communicative target and do not saturate. When giving feedback, reference specific evidence so that your feedback doesn't appear to be arbitrary, and call on everyone to assist those who are more challenged. The process values successful repair and audience awareness alongside accuracy, supporting continuing participation rather than withdrawing for perfection.

Assessment accommodation records must be done without being transformed into deficit annotations on the learner's public work. The evidence presented may need additional processing time, replaying, displaying in large print, captioning, quiet space for response, or an alternative method for input. The relevant construct scaffold and the answer scaffold are offered by the two. For example, it would not be appropriate to require a transcript when the purpose for requiring the reading of the transcript is to help the speaking task, but not when the intention is for it to help the listening task. The clarity of the design reasoning makes accommodations consistent, rational, and receptive to student feedback [1], [4], [10].

Assessment moment	Criteria	Equivalent evidence routes	Instructional decision
City-guide performance	Accuracy, comprehensibility, audience value, accessibility, collaboration	Multimodal group artifact plus individual contribution	Moderate jointly against common criteria
Delayed follow-up	Maintenance, spontaneous use, strategy transfer	New task and learner interview	Revise curriculum sequence and framework implementation

8. Leadership, Ethics, and Sustainable Implementation

Although the framework is designed for classroom use, its implementation requires organizational support. It is critical that leaders provide co-planning time, ensure both teachers have access to curriculum and student information, source accessible tools, and provide technical response during lessons. Editable texts and transcripts, audio and alternative formats, assessment criteria, and notes from successful support will be kept in the shared repository. Through various actors' development of new operational routines, they translate the principles of innovation and leadership reflected in the evidence base, allowing them to remain resilient in the face of personnel turnover.

“Learning by doing” refers to learning by actively participating in an experience. Students learn best by doing things, rather than by being shown things. One could agree that students learn better when they are active participants in the educational experience rather than passive recipients of information and knowledge. Both teachers require sufficient target-language knowledge and access to knowledge to legitimately perform instructional roles, even when expertise differs. Lesson study is valuable: the pair together designs a single task, monitors a set participation question, analyses evidence, and modifies the next lesson. The development of co-teaching is, therefore, incorporated into teaching, rather than abstracted in a general workshop, [12], [13], [14], [15], [16].

Voice recordings, videos, learning profiles, and prompts within artificial intelligence reveal who they are and what disability they have. The city guide may only use forenames if there is no other option available; the guide must avoid faces unless consent has been explicitly given; files must be stored in a responsible place, and a deletion/transfer date must be set. It is an optional condition for the students to publish their work. As such, through anonymous or pseudonymous means, learners can contribute without losing status in the group [35].

Continuity planning also addresses device shortages, bandwidth failure, and uneven home support. Every essential task has an offline or paper equivalent,

no paid personal subscription is required, and an asynchronous option is available during supported school time. The educators review which routes learners use and whether the alternatives provide equivalent opportunities to participate. A technology is considered sustainable when it reduces a barrier without transferring hidden work to the learner or family and when the curriculum remains usable if the technology is unavailable.

9. Discussion and Limitations

The proposed design integrates four strands: collaborative professional responsibility, functional matching of assistive technology, rights-based inclusion, and leadership for change. The co-teaching model changes through interaction; technology is chosen after a barrier is identified; assessment records the support context; and leadership makes the resources and review accessible. The city-guide project provides the components with a common communicative purpose.

The design avoids framing inclusion and digital learning as binary choices. All students accessing a same differentiated learning/teaching experience is inclusive teaching. Digital language learning is not intrinsically innovative nor dehumanising. While structured mobile collaboration, pronunciation support, multimodal access, and supervised AI can foster participation [18], [19], [20], [21], [22], [23], [24], [25], [26], [27], [28], educational value will depend on task design, user agency, level of access, and human feedback. When communication of the right message is most important, a more appropriate solution may be a paper card, a live peer, or an alternative keyboard.

The proposal's limitations give an overview of its boundaries and how far the proposal can go. The latest evidence regards contexts of English or mixed additional language rather than Italian, and studies differ in age, disability, technology, duration, and outcome. The experimental evaluation of the twelve-lesson sequence did not occur. CEFR agreement is conceptual and would require local curriculum-mapping. Co-teaching assumes that adequate staffing and planning conditions are in place, but these are not

necessarily commonly available. The capacities of AI and platforms also get better quickly than school policy and independent verification.

The framework should therefore be regarded as a design hypothesis. It does not claim that any framework removes structural inequity, nor that offering options excludes the need for individualised accommodation. It prevents inferences of learning gains from a device devoid of evidence. The four tables provide a structure through which the framework can be tested, documented, and revised. The clarity of intent and context is a stronger basis for implementation than importing a commercial tool or generic lesson package that has no theory of access.

10. Conclusion

The article presents a project which envisages the use, in co-teaching and through the use of digital tools and assistive technologies, of shared learning objectives in a concrete vision of teaching Italian inclusively. The twelve-lesson sequence illustrated in this paper shows how novices can move from simple personalised exchanges to the co-creation of an accessible city guide where participation is flexible and valuable for different learners.

The greatest value of the framework is not in harnessing extra teachers, devices and AI tools, but in how these can be harnessed to lower barriers and promote communication, participation and learner independence. Teaching and interaction should always take precedence over technology. Accordingly, when the teaching of inclusive languages is mediated by digital tools, the foremost consideration ought to be accessibility, privacy, fairness and clear learning goals.

Future research should apply ITALIAN-ACCESS across multiple lower-secondary schools with larger samples. Outcomes should include language performance, access and participation, pronunciation, literacy development, foreign-language anxiety, teacher workload, and implementation cost. It would also be valuable to examine how the framework operates for learners who have varying levels of literacy, hearing, attention, home language, and access to technology. Longitudinal studies could examine whether learning gains are maintained and transfer to new tasks. Utilizing feedback from learners, families, and teachers can help constantly improve the framework and its classroom activities.

Author Contributions

The authors contributed to conceptualization,

literature synthesis, framework development, writing, review, and final editing.

Funding

No funding was received for this work.

Conflicts of Interest

The authors declare no conflicts of interest.

11. References

1. J. Kormos and B. Indrarathne, Specific learning differences in learning, teaching, and assessing additional languages, *Language Teaching*, vol. 59, no. 2, pp. 139–163, 2026. <https://doi.org/10.1017/S0261444825100803>
2. E. Domagala-Zysk, J. Sedlackova, and K. Karpinska-Szaj, Editorial: Learning foreign languages: Experiences of persons with disabilities and special educational needs and their teachers, *Frontiers in Education*, vol. 10, 1663389, 2025. <https://doi.org/10.3389/educ.2025.1663389>
3. M. Karatsiori, T. Liontou, E. Domagala-Zysk, M. Poredos, M. Kosak Babuder, and K. Vogt, Internal motivation vs. learning environment support in EFL: Evidence from students with diverse learning needs across four European countries, *Frontiers in Education*, vol. 10, 1569323, 2025. <https://doi.org/10.3389/educ.2025.1569323>
4. I. Olszak and A. Borowicz, Learning styles and strategies of D/deaf and hard of hearing students in foreign language acquisition: A research report, *Frontiers in Education*, vol. 10, 1553031, 2025. <https://doi.org/10.3389/educ.2025.1553031>
5. M. Karatsiori, T. Liontou, E. Domagala-Zysk, K. Vogt, M. Kosak Babuder, and M. Poredos, Beyond barriers: Exploring foreign language learning experiences of students with diverse learning needs in four European countries, *Frontiers in Education*, vol. 10, 1520944, 2025. <https://doi.org/10.3389/educ.2025.1520944>
6. M. C. Campoy-Cubillo, Learning outcomes of project-based learning activities on access to functional diversity terms, *Frontiers in Education*, vol. 9, 1450096, 2025. <https://doi.org/10.3389/educ.2024.1450096>
7. M. Chomicz, Enhancing EFL writing skills for adult Deaf and hard of hearing individuals, *Frontiers in Education*, vol. 9, 1504503, 2025. <https://doi.org/10.3389/educ.2024.1504503>
8. K. Ruta-Korytowska and M. Wrzesniewska-Pietrzak, Literature for all in Poland? Opportunities and challenges of easy-to-read standard in special education for D/deaf students in primary school: Preliminary

- remarks, *Frontiers in Education*, vol. 9, 1501191, 2024. <https://doi.org/10.3389/feduc.2024.1501191>
9. M. Nemes, Teaching a second language to learners with mild intellectual disabilities: A Hungarian case study, *Frontiers in Education*, vol. 9, 1450095, 2024. <https://doi.org/10.3389/feduc.2024.1450095>
10. A. E. Middleton, M. Davila, and S. L. Frierson, English learners with dyslexia benefit from English dyslexia intervention: An observational study of routine intervention practices, *Frontiers in Education*, vol. 9, 1495043, 2024. <https://doi.org/10.3389/feduc.2024.1495043>
11. K. Urbann, K. Gross, A. Gervers, and M. Kellner, ‘Language means freedom to me’: Perspectives of Deaf and hard-of-hearing students on their experiences in the English as a foreign language classroom, *Frontiers in Education*, vol. 9, 1447191, 2024. <https://doi.org/10.3389/feduc.2024.1447191>
12. L. Forsman, Co-teaching literacy strategies for the inclusion of second-language learners: Possibilities for professional development, *Language and Education*, vol. 39, no. 3, pp. 638–655, 2024. <https://doi.org/10.1080/09500782.2024.2348596>
13. L. Ciletti, E. Baines, and M. P. Somerville, Co-teaching practices in Italian primary classrooms: A case for including the sociocultural framework in training teaching collaborations, *International Journal of Inclusive Education*, vol. 30, no. 3, pp. 439–455, 2025. <https://doi.org/10.1080/13603116.2025.2457461>
14. L. W. Qualls, G. A. Irgens, and S. E. Hirsch, Co-teaching as a dynamic system to support students with disabilities: A case study, *Education Sciences*, vol. 15, no. 6, 733, 2025. <https://doi.org/10.3390/educsci15060733>
15. T. Barron and M. Friend, Co-teaching: Are we there yet?, *Journal of Educational and Psychological Consultation*, vol. 35, no. 2, pp. 193–218, 2025. <https://doi.org/10.1080/10474412.2024.2422895>
16. A. Zamkowska, M. Pilgrim, and G. Hornby, Co-teaching: Review and guidelines for practice, *Preventing School Failure: Alternative Education for Children and Youth*, vol. 69, no. 2, pp. 111–117, 2024. <https://doi.org/10.1080/1045988X.2024.2404404>
17. R. Fitas, Inclusive education with AI: Supporting special needs and tackling language barriers, *AI and Ethics*, vol. 5, no. 6, pp. 5729–5757, 2025. <https://doi.org/10.1007/s43681-025-00824-3>
18. R. Metruk, Mobile-assisted language learning and pronunciation instruction: A systematic literature review, *Education and Information Technologies*, vol. 29, no. 13, pp. 16255–16282, 2024. <https://doi.org/10.1007/s10639-024-12453-0>
19. P. Guo, J. J. Jeyaraj, and A. B. Razali, A systematic review of collaborative mobile-assisted language learning practices using bibliometric, content, and scientometric analyses, *Humanities and Social Sciences Communications*, vol. 11, no. 1, 1435, 2024. <https://doi.org/10.1057/s41599-024-03940-3>
20. X. Wang, A. B. Hamat, and N. L. Shi, Designing a pedagogical framework for mobile-assisted language learning, *Heliyon*, vol. 10, no. 7, e28102, 2024. <https://doi.org/10.1016/j.heliyon.2024.e28102>
21. A. Chen, Y. Zhang, J. Jia, M. Liang, Y. Cha, and C. P. Lim, A systematic review and meta-analysis of AI-enabled assessment in language learning: Design, implementation, and effectiveness, *Journal of Computer Assisted Learning*, vol. 41, no. 1, e13064, 2025. <https://doi.org/10.1111/jcal.13064>
22. G. Xu, A. Yu, and L. Liu, A meta-analysis examining AI-assisted L2 learning, *International Review of Applied Linguistics in Language Teaching*, vol. 64, no. 2, pp. 905–937, 2026. <https://doi.org/10.1515/iral-2024-0213>
23. Y. Wang, T. Zhang, L. Yao, and P. Seedhouse, A scoping review of empirical studies on generative artificial intelligence in language education, *Innovation in Language Learning and Teaching*, pp. 1–28, 2025. <https://doi.org/10.1080/17501229.2025.2509759>
24. S. Lee, H. Choe, D. Zou, and J. Jeon, Generative AI (GenAI) in the language classroom: A systematic review, *Interactive Learning Environments*, vol. 34, no. 1, pp. 335–359, 2026. <https://doi.org/10.1080/10494820.2025.2498537>
25. M. Saarela, S. Gunasekara, and P. Kumarage, A meta-analysis of generative AI effects on language proficiency and affective-cognitive outcomes in language learning, *Discover Computing*, vol. 29, no. 1, 116, 2026. <https://doi.org/10.1007/s10791-026-10015-1>
26. B. Li, Y. L. Tan, C. Wang, and V. Lowell, Two years of innovation: A systematic review of empirical generative AI research in language learning and teaching, *Computers and Education: Artificial Intelligence*, vol. 9, 100445, 2025. <https://doi.org/10.1016/j.caeai.2025.100445>
27. G. Andreou and A. Argatzopoulou, A systematic review on the use of technology to enhance the academic achievements of children with attention deficit hyperactivity disorder in language learning, *Research in Developmental Disabilities*, vol. 145, 104666, 2024. <https://doi.org/10.1016/j.ridd.2023.104666>
28. L. Gu, Beyond the classroom: Exploring the impact of virtual reality exposure on foreign language anxiety

- with the mediating role of ESL Chinese learners' communicative confidence and fluency, *Humanities and Social Sciences Communications*, vol. 12, no. 1, 1349, 2025. <https://doi.org/10.1057/s41599-025-05030-4>
29. C. R. Navas-Bonilla, J. A. Guerra-Arango, D. A. Oviedo-Guado, and D. E. Murillo-Noriega, Inclusive education through technology: A systematic review of types, tools and characteristics, *Frontiers in Education*, vol. 10, 1527851, 2025. <https://doi.org/10.3389/educ.2025.1527851>
30. N. K. S. Putri, U. L. Yuhana, D. O. Siahaan, W. Rahayu, and E. Pardede, Assistive technology classification for students with disabilities in higher education: A systematic literature review, *IEEE Access*, vol. 13, pp. 28135–28149, 2025. <https://doi.org/10.1109/ACCESS.2025.3538322>
31. M. V. Samaniego Lopez, M. C. Orrego Riofrio, S. F. Barriga-Fray, and B. S. Paz Viteri, Technologies in inclusive education: Solution or challenge? A systematic review, *Education Sciences*, vol. 15, no. 6, 715, 2025. <https://doi.org/10.3390/educsci15060715>
32. A. Violic-Koprivec and Z. Rezić Tolj, Use of digital technology in learning French and Italian as a foreign language, *European Journal of Foreign Language Teaching*, vol. 6, no. 3, 2022. <https://doi.org/10.46827/ejfl.v6i3.4432>
33. C. Cervini and A. Zingaro, When learning Italian as a second language, tourism and technology go hand in hand, in *Proc. 7th International Conference on Higher Education Advances*, pp. 341–349, 2021. <https://doi.org/10.4995/HEAD21.2021.12961>
34. Council of Europe, *Common European Framework of Reference for Languages: Learning, Teaching, Assessment-Companion Volume*, Strasbourg: Council of Europe Publishing, 2020. No DOI. <https://rm.coe.int/common-european-framework-of-reference-for-languages-learning-teaching/16809ea0d4> [Access Date: 01/07/2026]
35. United Nations, *Convention on the Rights of Persons with Disabilities*, Treaty Series, vol. 2515, p. 3, 2006. Available: <https://www.ohchr.org/en/instruments-mechanisms/instruments/convention-rights-persons-disabilities> [Access Date: 01/07/2026]
36. CAST, *Universal Design for Learning Guidelines*, version 3.0, 2024. Available: <https://udlguidelines.cast.org> [Access Date: 01/07/2026]