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Technology mediation, digital environments and engagement in the Provincial Centres for Adult Education (CPIA): an exploratory study into teachers' perceptions

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Abstract:

Digital technologies are transforming adults participate in and engage with learning processes. However, empirical evidence on technology-mediated learning in Provincial Centres for Adult Education (Centri Provinciali per l'Istruzione degli Adulti, CPIA) remains limited. These centres serve learners from diverse cultural backgrounds, including many with a migrant background. This study explores teachers' perceptions of the technology mediation to student engagement and inclusion. Since engagement was not measured directly, the items assessed teachers' perceptions of the conditions that enable it. A structured questionnaire was administered online to the entire teaching staff (n. 30) of the "Alessandro Leogrande" CPIA in Bari. Fourteen teachers responded (46.7%), all women. Ten of the 19 items were analysed descriptively. These items used a five-point Likert scale and addressed digital preparedness, training, collaboration, and organisational support. 78.6% agreed that digital technologies are used to support learners facing language barriers, while 85.7% acknowledged their positive impact on inclusion. Most teachers felt prepared to use digital tools (85.7%), while 78.6% expressed a need for further training, and all respondents considered it necessary to strengthen in-service training in Diversity Management. The findings suggest that technology mediation requires an educational and organisational strategy integrating professional development, collegial collaboration, and leadership support.

Keywords: technology mediation; adult education; CPIA; learner engagement; diversity management; Italian as a second language (L2); adult migrants; teacher training.

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1. Introduction

With the advent of digital technologies in educational settings, technology mediation has taken on a different role in teaching and learning. New opportunities have emerged for participation and engagement, including for adult learners (UNESCO, 2023). However, international guidelines call for caution. Technology does not provide educational value simply by being available. Its value depends on how it is designed and integrated into pedagogical and organisational practices

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(UNESCO, 2023). This position is similar to that of Ranieri (2011), who criticised the "rhetoric of the obvious" in educational technology in Italy.

This issue is particularly relevant to the Provincial Centres for Adult Education (Centri Provinciali per l'Istruzione degli Adulti, CPIA), public institutions established by Presidential Decree No. 263/2012 to provide first-level adult education and Italian language courses for adults with a migrant background (President of the Republic, 2012). The same regulation stipulates that part of the learning pathway, generally not exceeding 20% of the total number of hours, may be completed remotely. Technology mediation therefore also has an institutional basis within CPIA (President of the Republic, 2012, Art. 4). CPIA learners vary considerably in age, educational background, and linguistic repertoire, and many are migrants enrolled in literacy courses and courses in Italian as a second language (L2). According to available data, the contexts, learning environments, and organisational processes within CPIA require flexible educational approaches supported by the informed use of digital technologies (Poliandri & Epifani, 2024). Other studies highlight substantial training needs, particularly in managing linguistic and cultural heterogeneity (Malagnini & Deiana, 2023).

1.1. Technology Mediation and Engagement in Adult Learning

The concept of engagement is generally understood as a multidimensional construct comprising behavioural, emotional, and cognitive components (Fredricks et al., 2004), shaped by the interaction between learner characteristics, teaching practices, and the institutional context (Kahu, 2013). Research on educational technology indicates that digital tools can support all these dimensions, although their effects depend on the pedagogical design within which they are embedded (Bond et al., 2020). These considerations align with the principles of andragogy, which emphasise experience, autonomy, and learners' orientation towards meaningful problems (Knowles et al., 2015). From this perspective, learning how to learn throughout life is a strategic resource for adults' capacity to adapt to change (Alberici, 2008).

For adult migrants, digital technologies can support language learning and participation by providing multimodal input, flexible access, and opportunities for interaction beyond the classroom. However, teachers report that their use is constrained by disparities in learners' digital literacy and by teachers' own digital skills (Maahs et al., 2025). Their effectiveness therefore depends on teachers' ability to integrate these technologies into their practice through appropriate digital competences, continuing professional development, and supportive organisational models (Calvani et al., 2010; Redecker, 2017), while fostering the integration of technological, pedagogical, and content knowledge (Mishra & Koehler, 2006).

1.2. Diversity Management as an Interpretive Framework

Diversity Management refers to the set of policies and practices that recognise and value individual differences as a resource for organisational effectiveness and innovation (Cox & Blake, 1991; Cuomo & Mapelli, 2007; International Labour Organization [ILO], 2022). This approach has also developed within the educational field, converging with intercultural pedagogy (Fiorucci, 2020) and inclusive approaches aimed at removing barriers to learning and participation by addressing cultures, policies, and practices (Booth & Ainscow, 2014). In classrooms

characterised by substantial heterogeneity in language, educational backgrounds, and learning pace, digital technologies can serve as an organisational lever for differentiating learning pathways, timings, and communication modes, thereby translating the value of diversity into practice. Within CPIA, this interpretive framework positions technology mediation within an educational and organisational strategy for the inclusive management of differences.

1.3. Aim of the Study

Empirical studies on technology mediation in adult education, particularly within CPIA, remain limited. This study therefore addresses the following research question: How do teachers perceive the contribution of technology mediation and digital learning environments to promoting engagement in learning processes within CPIA? In the absence of a direct measure of engagement, it is examined indirectly through perceived enabling conditions: the use of digital technologies with learners experiencing language-related disadvantage, their perceived impact on inclusion, teachers' digital preparedness and training needs, collaborative practices, and organisational support.

2. Materials and Methods

2.1. Research Design and Context

The study adopted an exploratory quantitative design based on a cross-sectional survey. It was conducted at the "Alessandro Leogrande" CPIA in Bari as part of the doctoral project "Equity, Diversity and Inclusion" (39th cycle) at Pegaso Telematic University, within a broader research project on Diversity Management in schools.

2.2. Participants

The target population consisted of the 30 teachers employed at the CPIA. The questionnaire was administered to the entire population, and 14 teachers participated (response rate: 46.7%), all of whom were women. The mean age was 53.6 years (SD = 8.2; range: 42–65). Length of service, recorded through an open-ended question that did not specify whether it referred to total teaching experience or experience at the CPIA, ranged from 2 to 38 years (Mdn = 10.5; M = 15.9; SD = 11.9): seven respondents reported up to 10 years of service, three reported between 11 and 20 years, and four reported more than 20 years. Regarding their roles, seven described themselves generically as teachers, five as literacy or Italian as a second language (L2) teachers, and two provided responses that could not be classified.

2.3. Instrument

Data were collected using a purpose-designed structured questionnaire comprising 19 items. The first section (items 1–4) collected socio-professional information on gender, age, role, and length of service. The second section (items 5–19) included 15 statements rated on a five-point Likert scale (1 = strongly disagree, 5 = strongly agree), designed to assess teachers' perceptions of educational inclusion, the use of digital technologies in teaching, professional collaboration, organisational support, and training needs. The questionnaire began with definitions

of the main constructs (teaching practices, Diversity Management, school inclusion, and welcoming practices) to promote a shared understanding of the items.

For this paper, the items most closely aligned with the research objective were selected, namely items 10–19 (Table 1). Items 5–9, which addressed other dimensions of the broader research project, were not considered in this study. Socio-professional variables were used solely to describe the participants.

2.4. Procedure and Ethical Considerations

The questionnaire was administered online via Google Forms between March and April 2026. Participation was voluntary. The introductory page informed participants about the aims of the study and the processing of personal data in accordance with Regulation (EU) 2016/679 (General Data Protection Regulation, GDPR) and Legislative Decree No. 196/2003. Completing and submitting the questionnaire constituted informed consent. Responses were collected anonymously, and no information enabling the identification of participants was recorded. Given the small population size, socio-professional data and responses are reported exclusively in aggregated form. The anonymised dataset is available from the corresponding author upon reasonable reques.

2.5. Data Analysis

Responses were numerically coded from 1 to 5. Open-ended responses concerning role and length of service were retrospectively coded into categories (Section 2.2). For each selected item, frequencies, percentages, means, standard deviations (using the sample formula), and medians were calculated. The agreement percentage was defined as the proportion of respondents who selected 4 or 5. Means and standard deviations are reported to summarise the distributions, while acknowledging the ordinal nature of Likert data (Jamieson, 2004; Norman, 2010). Given the exploratory design and the small number of participants, no inferential analyses were conducted.

3. Results

Table 1 and Figure 1 present the response distributions and descriptive statistics. Overall, agreement (responses of 4 or 5) ranged from 78.6% to 100% (11 to 14 out of 14 respondents), with mean scores ranging from 3.86 to 4.57. The "strongly disagree" option was never selected, and no more than one respondent expressed disagreement with any given item. With 14 respondents, each response accounts for approximately 7.1 percentage points; therefore, differences of one or two responses should not be overinterpreted.

Table 1. Response distributions and descriptive statistics for items 10–19 (n = 14).

Item[1]	1	2	3	4	5	Agreement (%)	M	DS	Mdn
10. To what extent are digital technologies used to support the learning of students experiencing language-related disadvantage?	0	0	3	9	2	78,6	3,93	0,62	4

11. To what extent do you think digital technologies have a positive impact on inclusion?	0	1	1	9	3	85,7	4,00	0,78	4
12. How prepared do you feel to use digital tools for inclusive teaching?	0	1	1	11	1	85,7	3,86	0,66	4
13. To what extent do you think further training is needed on the use of technologies to promote inclusion?	0	1	2	6	5	78,6	4,07	0,92	4
14. To what extent is collaborative teaching (cooperative learning, group work) encouraged in CPIA classrooms?	0	0	1	9	4	92,9	4,21	0,58	4
15. To what extent do you think current resources (materials, spaces, tools) are adequate to support inclusion?	0	1	2	9	2	78,6	3,86	0,77	4
16. How supported do you feel by the school leadership and the CPIA organisation in implementing inclusive practices?	0	1	2	8	3	78,6	3,93	0,83	4
17. To what extent do you think teachers collaborate to address the challenges of inclusion?	0	1	0	11	2	92,9	4,00	0,68	4
18. To what extent do you think it is necessary to strengthen staff continuing professional development in Diversity Management?	0	0	0	11	3	100,0	4,21	0,43	4
19. To what extent do you think your work experience at the CPIA contributes to your professional development in inclusion and diversity management?	0	0	0	6	8	100,0	4,57	0,51	5

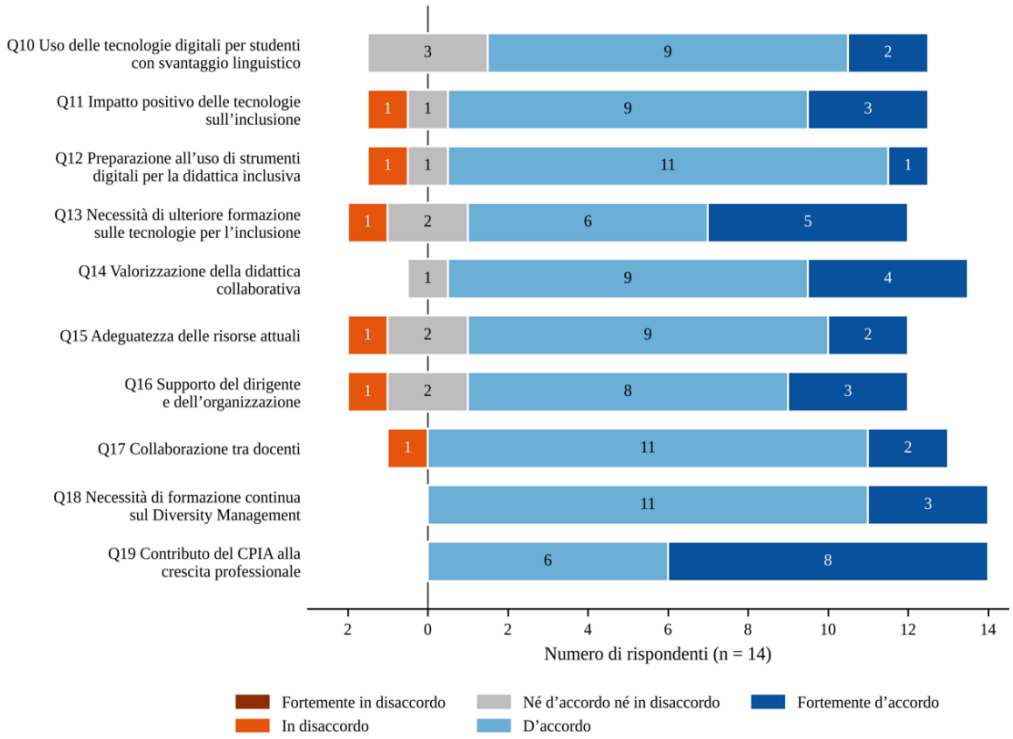
[1]Agreement (%) is the proportion of respondents selecting 4 (agree) or 5 (strongly agree). M = mean; SD = standard deviation; Mdn = median. The response scale ranged from 1 (strongly disagree) to 5 (strongly agree).

3.1. Digital Technology, Inclusion, and Engagement

Eleven out of 14 teachers (78.6%) selected agreement responses (4 or 5) when asked whether digital technologies are used to support the learning of adults experiencing language-related disadvantage (M = 3.93; SD = 0.62); the remaining three selected the neutral option. A similar proportion (85.7%; 12 out of 14)

acknowledged the positive impact of digital technologies on inclusive processes (M = 4.00; SD = 0.78). These findings reflect perceptions and do not allow causal inferences about inclusion or engagement.

Figure 1. Response distributions for items 10–19 (n = 14). The bars are centred on



the neutral category; the numbers within the bars indicate frequencies.

3.2. Digital Preparedness and Training Needs

Regarding professional competences, 85.7% (12/14) of the teachers considered themselves prepared to use digital tools for inclusive teaching (M = 3.86; SD = 0.66), although only one selected the highest response category. At the same time, 78.6% (11/14) considered further training on the use of technologies for inclusion necessary (M = 4.07; SD = 0.92). This item showed the greatest variability across the set, with five teachers strongly agreeing and three selecting neutral or disagreement responses. Training needs were therefore not perceived with the same intensity by all respondents.

3.3. Collaboration, Organisational Support, and Professional Development

A total of 92.9% (13/14) of the teachers reported that collaborative teaching practices were encouraged in CPIA classrooms (M = 4.21; SD = 0.58), and the same proportion acknowledged collaboration among colleagues in addressing the challenges of inclusion (M = 4.00; SD = 0.68). Leadership and organisational support (M = 3.93; SD = 0.83) and the adequacy of resources (M = 3.86; SD = 0.77) were each acknowledged by 78.6% (11/14), with slightly lower mean scores,

reflecting a difference of one or two responses. All respondents agreed on the need to strengthen in-service training in Diversity Management (M = 4.21; SD = 0.43) and on the contribution of CPIA experience to their professional development, which received the highest mean score (M = 4.57; SD = 0.51).

4. Discussion

Teachers regard digital technologies as a relevant resource for supporting adults with diverse linguistic and cultural needs. This is consistent with international studies on the potential of digital tools for adult migrants learning a new language (Maahs et al., 2025) and with research linking educational technologies to the behavioural, emotional, and cognitive dimensions of engagement (Bond et al., 2020; Fredricks et al., 2004). Since engagement was not measured, the findings indicate that technologies are perceived as one of the conditions supporting participation, rather than as evidence of increased engagement.

Digital preparedness and training needs are not contradictory: a positive self-assessment of digital competence coexists with an awareness of the need for continuous professional development. This pattern reflects the progressive model underpinning the DigCompEdu framework (Redecker, 2017), in which competence is viewed as a developmental trajectory rather than a stable attribute, and echoes the training needs reported by CPIA teachers in other Italian studies (Malagnini & Deiana, 2023). The fact that only one teacher felt fully prepared, while five strongly agreed that further training was necessary, suggests that professional development should focus on integrating technological and pedagogical knowledge (Mishra & Koehler, 2006) into inclusive teaching, rather than on the use of tools alone (Calvani et al., 2010).

The perceived effectiveness of technology mediation can be considered in relation to collaborative and organisational conditions. High levels of agreement regarding teacher collaboration and the value of collaborative teaching, alongside slightly lower ratings (a difference of one or two responses) for organisational support and resources, suggest that teachers situate the potential of digital environments within the school's collegial and institutional life. Research on teacher professional development shows that collaboration, sustained duration, and alignment with school priorities are characteristics of effective programmes (Darling-Hammond et al., 2017; OECD, 2019). In CPIA, where organisational processes are a distinctive feature (Poliandri & Epifani, 2024), this implies that investment in technology should be accompanied by investment in leadership, collaborative planning, and resources.

Viewed through the lens of Diversity Management (Cuomo & Mapelli, 2007; ILO, 2022), the unanimous call for training in this area suggests that teachers regard the management of diversity as a core and evolving professional competence to which technology mediation can contribute. However, this contribution requires that innovation not be reduced to the availability of tools, but be accompanied by continuous professional development, professional collaboration, organisational support, and informed instructional design, in line with intercultural (Fiorucci, 2020) and inclusive (Booth & Ainscow, 2014) perspectives.

4.1. Limiti e sviluppi futuri

This study has several limitations. The sample is small, self-selected, and drawn from a single CPIA, and all respondents were women. The findings are therefore not generalisable and may reflect the views of teachers with a particular interest in the topic. The data are based on self-reported perceptions, which may be influenced by social desirability bias. The instrument was purpose-designed, and its psychometric properties were not assessed. Furthermore, some items combine a question about frequency or satisfaction with an agreement scale (e.g., item 10), which may have influenced their interpretation. The concentration of responses at the higher end of the scale (no response of 1 and at most one response of 2 per item) suggests a possible ceiling effect or acquiescence bias. The definitions of the constructs provided at the beginning of the questionnaire may also have influenced responses. Future research could extend the survey to other CPIA, use validated scales, incorporate learners' perspectives, and adopt a mixed-methods design.

5. Conclusion

Despite the small number of participants, this study provides an initial exploratory account of technology mediation in a CPIA from teachers' perspectives. Teachers perceive digital technologies as a resource for supporting adults with diverse linguistic and cultural needs and promoting inclusion, while also highlighting the need for continuous professional development, collaboration among colleagues, and organisational support. These findings may inform the design of professional development programmes and digital learning environments that address learners' linguistic and cultural heterogeneity.

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