Journal of Inclusive Methodology and Technology in Learning and Teaching
ISSN 2785-5104
Anno 6 n. 4 (2026)

EDIZIONI UNIVERSITARIE ROMANE
editoria scientifica dal 1952

MiRacconto and engagement in digital self-narration: exploring scaffolding, participation and choice in Italian primary school

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Abstract: This exploratory study examines how observed involvement, choice, perceived ease, autonomy, and adult support are expressed during children's interaction with MiRacconto, a guided digital self-narrative application for primary school. Fifty fifth-grade pupils from three school sites completed the activity individually while an external observer recorded involvement, decision-making style, autonomy/support, and other interactional indicators. Descriptive analyses were complemented by exploratory non-parametric comparisons. Observed involvement was generally high, with 86% of pupils receiving ratings of 4 or 5. High involvement occurred across different decision-making profiles and support conditions, while 88% of pupils perceived the activity as easy. Differences in involvement across autonomy/support conditions and decision-making styles were not statistically significant and showed small effect sizes. Perceived ease was also not significantly associated with receiving support. The findings suggest that independent task completion and meaningful participation should not be treated as interchangeable. Adult assistance was compatible with high involvement when children retained an active role in making choices. Although preliminary, these results support an interpretation of supported participation that connects scaffolding and Universal Design for Learning around the reduction of barriers while preserving learner agency.

Keywords: student engagement; digital self-narration; scaffolding; Universal Design for Learning; supported participation

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1. Introduction

Student engagement refers to the quality of students' participation in learning rather than to presence or task completion alone. It is generally described through behavioural, affective, and cognitive dimensions, whose expression may vary according to the task, the learning environment, the relationships involved, and the opportunities available to the learner (Fredricks et al., 2004). This makes engagement particularly relevant, but also difficult to capture, in technology-enhanced learning. No single measure can fully represent it, and studies have therefore drawn on self-report instruments, observational methods, behavioural traces, physiological indicators, and digitally generated data (Fredricks & McColskey, 2012; D'Mello et al., 2017; La Manna et al., 2025).

In inclusive education, this raises a further question: how should participation be interpreted when learners require support? Independence is sometimes taken as an implicit indicator of successful participation. A child who completes an activity without assistance may appear more autonomous and, by implication, more engaged. Yet autonomy and engagement are not interchangeable. Participation itself is multidimensional and may involve not only autonomy and involvement, but also accessibility, interaction, belonging, and acceptance (Edström et al., 2024). A learner may need a prompt, clarification, or practical assistance and still remain attentive, make choices, and take an active role in the activity. Conversely, completing a task independently does not in itself indicate how interested or involved the learner was.

The role of support therefore requires careful interpretation. Scaffolding research has long emphasised that assistance can enable learners to manage aspects of a task that would otherwise be difficult to address independently (Wood et al., 1976). Later work has described scaffolding in terms of contingency, fading, and the gradual transfer of responsibility, while also drawing attention to the distributed forms that support may take in classroom settings (van de Pol et al., 2010; Puntambekar, 2022). From a pedagogical perspective, the relevant issue is not simply whether support is present, but how it functions within the activity. It may facilitate access, clarify task demands, or sustain participation, but it may also become intrusive when it substitutes for the learner's own actions or decisions.

Universal Design for Learning (UDL) provides a useful framework for addressing this variability. Rather than assuming a single way of accessing, engaging with, or responding to a learning task, UDL emphasises reducing barriers and providing flexible opportunities for engagement, representation, and action (CAST, 2024). Learner variability is therefore anticipated rather than treated as an exception. From this perspective, inclusion is not restricted to formally identified categories of need, but concerns the capacity of the learning environment to accommodate variability across learners. A need for support cannot automatically be taken as evidence of weaker participation; it may instead reflect the interaction between task demands, environmental accessibility, and available supports.

These issues are particularly visible in digital learning activities, where it is possible to observe how learners interact with prompts, interfaces, choices, and different forms of mediation. Yet engagement in technology-enhanced environments remains difficult to operationalise consistently. Reviews report substantial variation in definitions and measurement approaches, often with a strong reliance on self-report measures (Nkomo et al., 2021; La Manna et al., 2025). Research focused specifically on children has reached similar conclusions, showing that different studies capture different facets of engagement (Harverson et al., 2026). Observational approaches are especially useful when the focus is on visible involvement, although they cannot capture the full multidimensional construct (D'Mello et al., 2017; La Manna et al., 2025).

Recent studies with children also suggest that engagement is task-sensitive. In technology-mediated educational activities, structured observation has been used to capture different aspects of children's involvement. Fiorini et al. (2026), for example, reported different engagement profiles across two tasks carried out with the same robotic system. Although the context differs from MiRacconto, the study illustrates how engagement can be understood as situated within the relationship

between learner, task, and technological environment rather than as a stable characteristic of the child.

These issues are examined here through MiRacconto, a digital self-narrative application for primary school pupils. The application guides children through visual prompts and choices organised around the metaphor of a tree, inviting reflection on experiences, personal characteristics, perceived competences, and future-oriented representations. MiRacconto belongs to a broader line of work on digital storytelling and multimodal narrative environments for self-recognition and inclusive participation in primary education (Sgambelluri et al., 2026), while its pedagogical architecture has been described elsewhere (Sgambelluri & Placanica, 2025).

The focus here is narrower. Rather than evaluating the effectiveness of the application, the study examines children's interaction with MiRacconto in terms of observed involvement, decision-making style, perceived ease, autonomy, and adult support. It does not test whether support causes engagement, but explores how different forms of assistance occur alongside children's involvement, perceptions of ease, and choices. In doing so, it questions a simple opposition between autonomy and dependence and considers whether meaningful participation may also occur under supported conditions.

The study was guided by the following research questions:

1. What patterns of engagement, choice and autonomy emerge during children's interaction with a guided digital self-narrative task?
2. How does perceived ease coexist, at a descriptive level, with different levels of adult support?
3. What pedagogical implications can these patterns offer for understanding supported participation in inclusive digital learning environments?

2. Materials and Methods

This exploratory and descriptive study involved 50 fifth-grade pupils attending three primary school sites within the same Italian comprehensive school. It was designed to examine how children interacted with MiRacconto in an ordinary school setting, with particular attention to observed involvement, decision-making, autonomy, perceived ease, and the support provided during the activity. The study was not experimental and did not aim to test the effectiveness of the application or establish causal relationships. The sample did not include pupils with certified disabilities or formally identified special educational needs. The inclusive implications considered here therefore concern learner variability and the accessibility of the learning environment rather than evidence relating to a specific disability or special-needs population.

MiRacconto is a digital self-narrative application designed for primary school pupils. The activity is organised around the metaphor of a tree and guides children through a sequence of visual prompts and predefined choices concerning significant experiences, personal characteristics, perceived competences, and future-oriented representations. Its design belongs to a broader line of research on inclusive digital storytelling and multimodal narrative environments in primary education (Sgambelluri et al., 2026; Sgambelluri & Placanica, 2025). The pathway provides multimodal narrative scaffolding through successive steps and visual and auditory mediators, while leaving the child responsible for selecting personally meaningful content. This is consistent with approaches to scaffolding that emphasise the

coordination of different forms of support while preserving and progressively transferring responsibility to the learner (Puntambekar, 2022). The structured format was intended to reduce demands associated with free writing, spontaneous verbalisation, and the independent organisation of a narrative without replacing the child's authorship.

Data collection took place individually. Each child used MiRacconto on an Android tablet and completed the structured pathway. The researcher clarified instructions when needed and recorded the choices made in the different sections of the application, without making choices on the child's behalf. At the same time, a doctoral researcher external to the project completed an ad hoc observation grid documenting the child's behaviour during the activity. This procedure allowed the choices made within the application to be distinguished from observational data concerning how the child approached and managed the task. Sessions lasted between 4 and 11 minutes, with a mean duration of 7.16 minutes and a median of 7 minutes.

The observation grid was developed specifically for the pilot study and used for exploratory and descriptive purposes; it was not a psychometrically validated engagement scale. The indicators were treated as operational categories documenting children's interaction with the application. The grid included autonomy (total autonomy, verbal support, physical support, or combined verbal and physical support), decision-making style (reflective, impulsive, or hesitant), accessibility barriers, emotional coherence, touchscreen interaction, involvement, and attunement with the researcher. Involvement and attunement were recorded through synthetic observational ratings referring to participation, attention, and quality of interaction during the session.

The main variables were observed involvement, autonomy/adult support, decision-making style, and perceived ease. Observed involvement was treated primarily as an indicator of the observable or behavioural dimension of engagement rather than as a comprehensive engagement measure, in line with research showing that different methods capture different dimensions of the construct (Fredricks & McColskey, 2012; D'Mello et al., 2017; La Manna et al., 2025). Perceived ease was based on the child's final evaluation. Accessibility barriers, touchscreen interaction, emotional coherence, and attunement were used only to contextualise the interaction. Final fatigue was excluded as a main indicator because it could be influenced by session timing and time of day. Data were initially organised and coded in MAXQDA, where the observational categories and individual-level records collected during the pilot study were checked and structured for analysis. The dataset was then exported for statistical analysis in R version 4.6.1 (R Core Team, 2026). Before analysis, data consistency was checked by verifying the number of cases, category labels, missing values, and correspondence between individual records and previously reported frequency distributions. Original categorical variables were preserved, while a limited number of derived variables were created for specific descriptive and exploratory comparisons.

The analysis was primarily descriptive and pattern-oriented. Frequencies and percentages were calculated for the main categorical variables, while mean, median, and standard deviation were reported for the observed involvement rating. Cross-tabulations were used to examine how involvement was distributed across

autonomy/support categories and decision-making styles. For descriptive profiling, involvement ratings of 4 or 5 were grouped as high involvement. This grouping was used only to summarise the observed patterns and was not treated as a validated cut-off for engagement. Perceived ease was examined across the four autonomy/support categories, and an integrated descriptive profile combining adult support, perceived ease, and observed involvement was constructed to explore how these dimensions appeared together within the sample.

Exploratory inferential analyses were used as secondary checks. Kruskal–Wallis tests compared observed involvement across autonomy/support categories and decision-making styles, while a Mann–Whitney U test compared total autonomy with any form of support. Effect sizes were reported as $\eta^2(H)$ for Kruskal–Wallis tests and r for the Mann–Whitney comparison. For perceived ease, autonomy/support was collapsed into total autonomy versus any support and ease into easy versus so-so/difficult; Fisher's exact test was then applied. Given the exploratory design, uneven subgroup sizes, and the concentration of ease responses in the highest category, findings were interpreted cautiously and non-significant results were not treated as evidence of equivalence.

The study received approval from the Ethics Committee of the Mediterranea University of Reggio Calabria. Informed consent was obtained from both parents of each participating child, and children were also asked to provide assent before taking part. Data were anonymised using participant codes, and neither names nor directly identifying information were included in the analysis or reporting. The participating school sites were also anonymised.

3. Results

Observed involvement was generally high. Of the 50 pupils, 22 (44%) received a score of 5, 21 (42%) a score of 4, and 7 (14%) a score of 3; no scores below 3 were observed. The mean involvement score was 4.30 (SD = 0.71), with a median of 4. Overall, 43 pupils (86%) received a score of 4 or 5.

Different levels of autonomy and adult support were observed during the activity. Twenty-two pupils (44%) completed the task in total autonomy, 18 (36%) received verbal support, 8 (16%) received both verbal and physical support, and 2 (4%) received physical support only. High involvement was observed in 21 of the 22 pupils working independently (95.5%), 12 of the 18 receiving verbal support (66.7%), all 8 pupils receiving combined verbal and physical support, and both pupils receiving physical support. Six of the seven pupils with an involvement score of 3 belonged to the verbal-support group.

Decision-making styles also varied across the sample. Thirty-two pupils (64%) were classified as reflective, 14 (28%) as impulsive, 3 (6%) as hesitant, and 1 (2%) as reflective/hesitant. High involvement was observed in 31 of the 32 reflective pupils (96.9%), 10 of the 14 impulsive pupils (71.4%), and 2 of the 3 hesitant pupils (66.7%). The pupil classified as reflective/hesitant received an involvement score of 3. Given the small number of cases in some categories, these percentages are presented descriptively.

Exploratory non-parametric analyses showed no statistically significant differences in observed involvement across the four autonomy/support categories, $H(3) = 3.96$, $p = .266$, $\eta^2(H) = .021$, or across decision-making styles, $H(3) = 4.64$, p

= .200, η^2(H) = .036. Both effect sizes were small. A Mann–Whitney U test comparing pupils working in total autonomy with those receiving any form of support also showed no statistically significant difference in involvement, U = 250.5, p = .224, r = .174, with a small effect size.

Perceived ease was high across the sample. Forty-four pupils (88%) described the activity as easy, 5 (10%) as so-so, and 1 (2%) as difficult. Among pupils who completed the task independently, 19 of 22 (86.4%) rated it as easy. The same response was given by 15 of 18 pupils receiving verbal support (83.3%), all 8 pupils receiving combined verbal and physical support, and both pupils receiving physical support.

Table 1. Perceived ease by autonomy/support condition

Autonomy/support	Easy	So-so	Difficult	Total
Total autonomy	19	3	0	22
Verbal support	15	2	1	18
Verbal + physical support	8	0	0	8
Physical support	2	0	0	2
Total	44	5	1	50

For the exploratory comparison, autonomy/support was collapsed into total autonomy versus any form of support, and perceived ease into easy versus so-so/difficult. Nineteen of the 22 pupils in the total-autonomy group (86.4%) and 25 of the 28 pupils receiving support (89.3%) rated the activity as easy. Fisher's exact test showed no statistically significant association between support condition and perceived ease (p = 1.00).

To examine these dimensions together, autonomy/support, perceived ease, and observed involvement were combined into descriptive profiles.

Table 2. Integrated profiles of autonomy/support, perceived ease, and observed involvement

Autonomy/support	Perceived ease	N	High involvement (4–5)
Total autonomy	Easy	19	18
Total autonomy	So-so	3	3
Verbal support	Easy	15	11

Verbal support	So-so	2	0
Verbal support	Difficult	1	1
Verbal + physical support	Easy	8	8
Physical support	Easy	2	2

Taken together, these profiles did not follow a simple progression from greater independence and perceived ease to higher involvement. High involvement appeared under different combinations of autonomy, perceived ease, decision-making style, and adult support. All pupils receiving physical or combined verbal and physical support rated the activity as easy and showed high involvement, whereas one independently working pupil who rated the activity as easy received an involvement score of 3. The only pupil who rated the activity as difficult nevertheless showed high involvement.

4. Discussion

The findings point to a more nuanced relationship between independence, support, and participation than a simple autonomy–dependence continuum would suggest. High involvement appeared across different support conditions and decision-making profiles, while perceived ease remained high even when assistance was required. The exploratory comparisons showed no statistically significant differences and only small effect sizes. Although this cannot be taken as evidence of equivalence, involvement was clearly not confined to independent performance.

This is important because engagement cannot be inferred from a single observable behaviour. Research on engagement measurement has repeatedly shown that behavioural indicators, self-reports, observational measures, and technology-based data capture partly different aspects of the construct (Fredricks & McColskey, 2012; D'Mello et al., 2017; La Manna et al., 2025). In the present study, the observational rating therefore reflects visible involvement during the task rather than engagement in its full behavioural, affective, and cognitive complexity.

Decision-making style also varied across participants. Reflective pupils showed particularly high involvement, but high scores were also observed among impulsive and hesitant pupils. Given the small number of cases in some categories, these patterns remain descriptive, but they suggest that participation was not tied to a single behavioural profile.

A similar pattern emerged for perceived ease. Most pupils described MiRacconto as easy to use, including those who received support. The integrated profiles also showed that autonomy, ease, and involvement did not move together uniformly. Perceived ease, independence, and involvement therefore appear to capture related but distinct aspects of the learning experience.

This has implications for how educational support is interpreted. Scaffolding research has long emphasised that assistance should not be understood simply in terms of its presence or absence, but in relation to how it is adjusted to the learner and to the demands of the task (Wood et al., 1976; Puntambekar, 2022). Support

may clarify instructions, facilitate access, or help sustain participation, but it may also become restrictive if it replaces the learner's own action or decision-making. The pedagogical issue therefore concerns the function and calibration of support rather than its mere presence.

Universal Design for Learning offers a complementary perspective. UDL assumes learner variability as an ordinary condition of education and promotes flexible opportunities for engagement, representation, and action (CAST, 2024). From this viewpoint, differences in the amount or type of support required should not automatically be interpreted as evidence of weaker participation. What matters is whether the learning environment reduces barriers while preserving opportunities for agency, choice, and meaningful action.

MiRacconto was designed according to this logic. Its sequence of prompts, visual mediators, and predefined options reduces some of the demands associated with free writing, spontaneous verbalisation, and the independent organisation of a self-narrative, while leaving the substantive choices to the child. This design is consistent with previous work on MiRacconto and inclusive digital storytelling, where multimodal narrative environments have been proposed as tools for supporting self-recognition and participation without requiring a single mode of expression (Sgambelluri & Placanica, 2025; Sgambelluri et al., 2026). The present data show that children remained highly involved while using the application under different conditions of support, without implying that the structure itself caused higher engagement.

Recent work with children in technology-mediated educational activities offers a useful point of comparison. Fiorini et al. (2026) found different engagement profiles across two tasks using structured observation. Although the context differs from MiRacconto, the study supports the view that engagement is situated within the relationship between learner, task, and environment rather than being a stable characteristic of the child.

The findings can be interpreted through the lens of supported participation, understood here as an interpretive rather than measurement construct. It refers to situations in which learners remain actively involved while receiving assistance that facilitates access or continuation without replacing their substantive choices. Independence and participation should therefore not be treated as interchangeable concepts.

This distinction may be particularly useful in inclusive digital learning environments. A learner who needs clarification or practical assistance is not necessarily less engaged, just as independent task completion does not necessarily indicate deeper participation. The educational question is therefore not simply how much support a learner requires, but whether that support allows the learner to remain an active decision-maker within the activity. This interpretation is consistent with both scaffolding and UDL, which place emphasis on adapting conditions and supports rather than expecting all learners to participate in the same way (Puntambekar, 2022; CAST, 2024).

Several limitations need to be considered. The study involved a small convenience sample from a single comprehensive school, and the findings cannot be generalised to the wider population of primary school pupils. The sample also did not include pupils with certified disabilities or formally identified special educational needs, so the inclusive implications discussed here concern learner variability and

accessible educational design rather than direct evidence about specific disability groups. A further limitation concerns measurement: the observation grid was developed ad hoc for the pilot study and was not psychometrically validated. Observed involvement should therefore be interpreted as a structured description of visible participation and attention rather than as a standardised measure of engagement. In addition, the grid was completed by a single doctoral researcher and no inter-rater reliability procedure was carried out.

The adult support provided during the activity also requires further investigation. Support was not experimentally manipulated and was not coded according to specific scaffolding strategies, so the study can describe the forms of assistance that occurred but cannot determine which were more effective or whether the same child would have responded differently under another condition. Future research could distinguish more systematically between prompting, clarification, navigation support, encouragement, and physical assistance. Perceived ease also showed a marked ceiling effect, with 88% of participants rating the activity as easy, which reduced the variability available for examining its relationship with support. Larger and more heterogeneous samples, validated engagement measures, multiple observers, and more systematic coding of support strategies would help address these limitations.

Overall, the findings suggest that participation in a guided digital self-narrative activity cannot be reduced to independent task completion. In this sample, high observed involvement and positive perceptions of ease appeared under different conditions of adult support and decision-making. These results do not show that support improves engagement. They do, however, indicate that assistance and meaningful participation are not necessarily opposing conditions. For inclusive digital design, the relevant challenge may therefore be not to eliminate support, but to provide it in ways that reduce barriers while preserving the learner's opportunities to choose, act, and remain meaningfully involved.

5. Conclusions

This exploratory study highlights the importance of looking beyond independent task completion when interpreting children's participation in digital learning activities. In MiRacconto, high observed involvement appeared across different decision-making profiles and support conditions, while most pupils perceived the activity as easy.

From an inclusive pedagogical perspective, this shifts attention from the simple presence of support to the way support is provided. The relevant question is not whether assistance can be eliminated, but whether it helps reduce barriers while preserving the learner's opportunities to choose, act, and participate meaningfully. In this sense, the findings bring scaffolding and Universal Design for Learning into dialogue around a common concern: creating learning conditions that can accommodate variability without weakening learner agency.

The study remains preliminary because of its small and context-specific sample and the use of an ad hoc observational grid. Further research with larger and more heterogeneous groups, validated measures of engagement, multiple observers, and a more systematic analysis of adult support could help clarify how guided digital self-narration may support participation across diverse learner profiles.

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