

Designing futures through Digital Storytelling: a Universal Design for Learning - based mixed-methods study in Italian primary schools

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Abstract: Early guidance in primary education can be framed as a preventive and inclusive process that nurtures agency, self-awareness, and the capacity to imagine future possibilities. These early competencies may serve as prerequisites for later life planning and, indirectly, for broad notions of employability understood as navigating transitions with awareness and initiative (Savickas, 2014; Guichard, 2005). Consistent with the Italian Guidelines for Guidance and Orientation (Decreto Ministeriale 328/2022), this perspective encourages schools to embed guidance-related experiences from the early years. Within this framework, digital storytelling offers a formative device: narration organises experience and supports self-construction (Bruner, 1990), while guided autobiographical work may foster voice, reflection, and inclusion, particularly for pupils at risk of marginalisation (Gaspari, 2024). This article presents the research design developed to evaluate *MiRacconto*, a Universal Design for Learning (UDL)-oriented digital storytelling environment structured through the “competence tree” metaphor and generating a personalised narrative PDF as a child-friendly e-portfolio (Sgambelluri & Placanica, 2025). The study adopts a quasi-experimental pre-test/post-test mixed-methods design with an experimental group and an aesthetic-control group. Administration is individual, supported when necessary by a teacher for pupils with certified disabilities, and documented through structured logbooks. Quantitative data will be collected at T0 and T1 using PASS (Hogrefe Editore, 2024), while qualitative data will derive from narrative PDFs and observational records. Integrated analyses will examine changes in attitudes toward self and school and explore how agency and future-oriented traces emerge, with particular attention to accessibility and participation for pupils with special educational needs.

Keywords: Digital storytelling; Universal Design for Learning; Life Designing; early guidance; primary school.



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¹ Pur essendo il contributo frutto di un lavoro condiviso, F. Placanica è autrice dei paragrafi 2 e 3, mentre R. Sgambelluri ha coordinato scientificamente il lavoro ed è autrice del paragrafo 1. Entrambe le autrici hanno contribuito alla stesura delle conclusioni e alla revisione della versione finale del contributo.

1. Pedagogical and Theoretical Frameworks

In recent years, guidance in education has been increasingly framed as a continuous process that should begin early and be sustained throughout schooling. In Italy, this shift is made explicit by the national Guidelines for Guidance and Orientation (Decreto Ministeriale 328/2022), which define guidance as an inclusive and lifelong educational responsibility rather than a punctual intervention reserved for the transition to secondary school (Canevaro et al., 2022). If guidance is conceived as a pervasive educational dimension, primary school becomes a crucial context: it is here that children can be supported in recognising personal resources, exploring interests, and developing early narrative representations of themselves across time. This approach also aligns with an inclusive perspective in which educational quality is evaluated not only in terms of achievement, but also through opportunities for meaningful participation and self-development (Cottini, 2016).

This relevance becomes even clearer in relation to educational inequalities. Without meaningful opportunities to explore personal resources and articulate aspirations, pupils in more vulnerable positions may experience “non-choice” trajectories, characterised by hetero-directed decisions and limited agency, which can amplify risks of disengagement and marginalisation in later transitions. Early guidance does not imply vocational decision-making in childhood; rather, it concerns the cultivation of prerequisites for later self-determination and life planning. In this sense, early guidance can be understood as part of the broader task of inclusive education: designing contexts where each pupil can participate meaningfully, exercise agency, and progressively build a personal project of life (D’Alonzo, 2018). Guidance, therefore, is not an “add-on” to the curriculum, but a structural dimension that intersects inclusion, wellbeing, and educational continuity.

The link with employability should therefore be interpreted as a long-term horizon, not as early job selection. In contemporary guidance models, the ability to construct meaning, to identify resources, and to anticipate transitions is connected to career adaptability and life design (Savickas, 2014; Guichard, 2005). In primary education, these constructs can be translated into age-appropriate objectives: fostering agency, supporting children in recognising what they can do and what matters to them, and helping them develop initial “possible selves” that remain open, revisable, and inclusive. Such competencies may later support more informed choices, including educational and vocational decisions, and can thus be considered foundational for employability in its broadest sense.

A key question is how to support these processes in everyday school life without turning guidance into a separate and specialist-only activity. Narrative offers a well-established theoretical basis. Narrative thinking allows individuals to organise experience, attribute meaning to events, and construct continuity between past, present, and anticipated futures (Bruner, 1990). Autobiographical narration (Demetrio, 2003), in particular, can function as a formative and transformative device: by selecting, interpreting, and re-elaborating lived experiences, the subject constructs self-images and gives coherence to personal history (Smorti, 1997). In inclusive contexts, narration has a specific value because it can return voice to pupils who risk being defined by labels or deficits, promoting recognition and agency (Gaspari, 2024).

Digital storytelling can further expand the range of expressive resources, enabling multimodal participation and supporting pupils for whom autonomous writing may represent a barrier (De Rossi & Petrucco, 2013). In this view, the pedagogical issue is not only what story is produced, but how the environment enables children to represent themselves, make sense of experience, and experiment with future-oriented imagination.

UDL provides a design framework that is particularly consistent with these aims. By treating learner variability as the norm, UDL recommends proactive design that offers multiple means of representation, action/expression, and engagement (CAST, 2018, 2024). In the case of narrative environments, this translates into designing not only “what” children narrate but also “how” they can narrate: through different modalities (visual, verbal, audio), with adjustable supports, and with scaffolding that can be adapted to developmental and functional diversity. This is especially relevant in primary school, where linguistic and metacognitive competencies are still developing and where classroom heterogeneity can be pronounced. Designing narrative tasks through a UDL lens means reducing barriers before they emerge and creating conditions in which diverse pupils can participate in the same meaningful activity with differentiated supports.

MiRacconto was developed at the intersection of these perspectives as a UDL-inspired digital storytelling environment for early guidance in primary education (Sgambelluri & Placanica, 2025). The app structures autobiographical reflection through the competence tree metaphor, which provides an intuitive scaffold organised into four stages: Roots (significant relationships and experiences), Trunk (values, emotions, and personal traits), Branches (skills, interests, and strengths), and Leaves (dreams, aspirations, and future possibilities). The progression is intended to be developmentally appropriate: it starts from concrete and relational references, moves toward inner characteristics and resources, and then opens to future-oriented imagination. Children’s guided choices across the stages are synthesised into a personalised narrative PDF representing the competence tree and the profile constructed during the activity. This artefact is conceived as a small e-portfolio that can also support dialogue between school and families, making the child’s self-representation visible in a child-friendly form.

A distinctive feature of MiRacconto is its attention to accessibility in coherence with UDL principles. Interaction does not rely on autonomous written production: children are supported through guided selections, pictograms, and audio supports, and the interface includes readability-oriented choices (including dyslexia-friendly solutions). Such features aim to sustain participation for pupils with diverse profiles, including pupils with learning difficulties, language vulnerabilities, or different cognitive functioning. Importantly, accessibility here is treated as a pedagogical condition: it is intended to enable pupils to engage with the meaning-making task of narration, rather than being excluded or reduced to a purely technical interaction due to reading and writing demands. In this sense, the app operationalises a view of technology as an intentional mediator serving inclusive educational aims.

Despite the potential of digital storytelling (Petrucco & De Rossi, 2009) for inclusive guidance, a key gap concerns evaluation. Many educational technologies are

adopted on the basis of plausibility and engagement; however, without careful design, it is difficult to distinguish the effect of the specific pedagogical architecture from non-specific influences such as novelty, aesthetics, or short-term motivation. Moreover, guidance-oriented narrative interventions require methodologies capable of linking outcomes (e.g., attitudes and perceived school experience) with process and product evidence (e.g., narrative traces, participation patterns, scaffolding needs). This study addresses that gap by proposing a quasi-experimental design that includes an aesthetic-control condition and combines quantitative measures with qualitative analysis of narrative products and observed interaction processes.

The study aims to evaluate whether participating in MiRacconto contributes to: (1) pre–post changes in attitudes toward self and school; (2) narrative products that display stronger signals of agency and future orientation; and (3) accessible and meaningful participation for pupils with special educational needs, including those with certified disabilities. The research questions are: RQ1: To what extent does experience with MiRacconto produce pre–post changes in attitudes toward self and school compared to an aesthetic-control condition? RQ2: Which indicators of agency and future orientation emerge in narrative products, and how are they distributed across the competence tree stages? RQ3: How do experience and products differ for pupils with SEN/certified disabilities, and which facilitators appear most relevant during individual administration?

These three research questions reflect the three outcome levels of the model—attitudinal, narrative, and participatory—thus making explicit the systemic logic guiding the study.

2. Research Design

The study adopts a quasi-experimental pre-test/post-test mixed-methods design with two conditions: an experimental group and a control group. To increase comparability and reduce variability linked to developmental stage, all participating classes will belong to the same grade level. Assignment will occur at class level: one class will be randomly selected as the control group, while the remaining classes will be assigned to the experimental condition. This approach introduces an element of random selection for the control class while respecting typical constraints of school-based research in natural settings, where randomisation at individual level is often impractical.

The experimental condition will use MiRacconto in its full version, based on the competence tree narrative logic (Roots, Trunk, Branches, Leaves) and producing a personalised narrative PDF (Sgambelluri & Placanica, 2025). The control condition will use an aesthetically identical app (same interface, visual style, and interaction mode), designed to match the novelty and attractiveness of the experience, but without the sequence of questions and the coherence of the competence tree narrative scaffold. The methodological rationale is to control for non-specific app effects: if differences emerge between conditions, they can be interpreted more plausibly as related to the competence tree-based narrative and guidance architecture rather than to using a “nice” digital tool per se.

The context is Italian primary schooling. Participants will include all pupils in the involved classes, including pupils with SEN and pupils with certified disabilities, consistent with the inclusive aims of the project and with the UDL stance that treats variability as ordinary (CAST, 2018, 2024). A central procedural decision is individual

administration. Rather than embedding the experience exclusively within whole-class activities, the protocol specifies that an examiner will administer the app to each pupil individually. This choice serves multiple aims: to standardise instructions and pacing, to reduce variability due to different classroom management styles, and to allow the research team to observe interaction dynamics more precisely. Individual administration is also coherent with the need to document the extent to which accessibility supports are sufficient and what additional facilitation is required.

For pupils with certified disabilities, the support teacher will be present alongside the child during the individual session. This presence is not intended to change the task itself, but to ensure access and educational support in line with inclusive practice. To strengthen scientific coherence and reduce single-researcher bias, a second researcher/observer will compile a structured logbook during each administration session. The logbook will record process indicators such as autonomy, requests for clarification, points of confusion, interaction strategies, time on task, episodes of engagement or fatigue, and the use of available supports. These data will support interpretation of outcomes and will make visible the micro-processes through which the narrative experience is constructed.

Quantitative data will be collected at T0 and T1 using PASS (Pupil's Attitude to Self and School), administered via the TEO-Test Erickson Online platform (Hogrefe Editore, 2024). PASS is used as the primary quantitative measure because it is designed for school-aged pupils and targets attitudes and perceptions that are closely connected to engagement, self-concept, and the experience of school life. In this protocol, PASS serves as an indicator of proximal change aligned with early guidance objectives: improving children's relationship with school and perceived self-related attitudes can be interpreted as a necessary condition for sustaining agency and participation. The adoption of PASS reflects a protocol refinement aimed at selecting an age-appropriate and feasible instrument for repeated measurement in primary classes.

Data collection will unfold across three phases over approximately 20–30 days. At T0 (baseline), PASS will be administered to all pupils, with standardised instructions and comparable conditions (Hogrefe Editore, 2024). Between T0 and T1, each pupil will complete the app experience in an individual session under the assigned condition (MiRacconto or control app), with the observer completing the logbook. At T1 (post-test), PASS will be administered again under conditions comparable to T0. During the post-test phase, the research team will also derive the qualitative dataset: indicators extracted from narrative PDFs in the experimental condition and process information from logbooks in both conditions.

Ethically, the study will start only after formal school authorisation and informed consent from parents/guardians. With regard to data governance, the app does not store personal data and does not collect identifiers. Narrative PDFs generated by MiRacconto remain in the possession of the children and families. For research purposes, the team will not archive identifiable copies of PDFs; instead, researchers will record in a pseudonymised dataset only indicators derived from children's choices and products, linked to a code and to minimal demographic information (age and sex), plus the presence of SEN/certified disability when relevant. The pseudonymised datasets will be stored securely and will be accessible only to authorised researchers.

3. Analysis Plan and Expected Contributions

The analysis plan integrates a quantitative component (attitudinal outcomes) and a qualitative component (narrative products and observed processes), followed by integrative interpretation.

Quantitatively, the aim is to estimate pre–post change (T0–T1) in PASS scores and compare trends between the experimental and control groups. Analyses will include descriptive statistics and distributional checks at T0 and T1, estimation of within-group change, and comparison of change between conditions, accompanied by effect size indices to support interpretation of practical relevance (Hogrefe Editore, 2024). Given that pupils are nested within classes and the design is quasi-experimental, analyses will be interpreted cautiously, avoiding overgeneralisation and considering class-level influences. Exploratory descriptive analyses may be conducted for subgroups (e.g., pupils with SEN/certified disabilities), with awareness of sample-size limitations for inferential conclusions.

Qualitatively, the aim is to understand how agency and future orientation are expressed through children’s narrative traces and how interaction conditions facilitate or constrain participation (Cunti & Priore, 2008). The first qualitative source consists of indicators derived from MiRacconto narrative PDFs in the experimental condition. A hybrid coding strategy will be used. Phase-based coding (Roots/Trunk/Branches/Leaves) will preserve the intended progression of the competence tree scaffold. Cross-cutting thematic coding will focus on indicators connected to agency and future orientation, such as recognition of resources and strengths, references to competence and self-efficacy, intentionality, presence of aspirations and “possible selves,” and narrative coherence in the profile constructed (Bruner, 1990; Smorti, 1997; Savickas, 2014). This approach allows the analysis to remain faithful to the design logic of the app while also addressing constructs relevant to guidance and inclusion.

The second qualitative source is the observer’s structured logbooks, which will be analysed to identify recurring patterns in interaction and facilitation. This includes, for instance, which steps prompt more requests for clarification, which supports are most frequently activated, how time is distributed across stages, and whether signs of engagement or fatigue cluster around specific interaction demands. For pupils with certified disabilities, the logs will also support interpretation of the role of the support teacher as a facilitator of access and participation. In this sense, logbooks function as process data that complement product-based evidence, making it possible to interpret not only what children produced but also how they got there.

Integration will occur through triangulation and joint displays, linking quantitative patterns (e.g., changes in PASS dimensions) with narrative indicators and observational evidence. This approach supports answers not only to the question of whether the intervention is associated with change, but also to how and under what conditions change may emerge. The mixed-methods integration is aligned with a narrative view of guidance: outcomes are interpreted alongside the meaning-making processes through which children represent themselves and imagine futures (Guichard, 2005; Savickas, 2014).

Expected contributions are threefold. First, methodologically, the protocol combines an aesthetic-control condition with individual administration and independent observation, strengthening interpretability and offering a pragmatic template for evaluating educational technologies beyond novelty effects. Second, theoretically,

the study places UDL, autobiographical narration, and Life Designing in dialogue within a developmentally appropriate primary-school context, examining how early agency and future imagination can be supported as inclusive educational aims (CAST, 2018, 2024; Gaspari, 2024). Third, practically, the study aims to generate design and implementation indications for UDL-inspired digital storytelling environments that can be embedded in early guidance pathways, with explicit attention to the participation of pupils with SEN and certified disabilities (D'Alonzo, 2018; De Rossi & Petrucco, 2013). Third, practically, findings are expected to inform concrete design principles for UDL-inspired digital storytelling environments that can be integrated into school-based early guidance routines, including indications on scaffolding intensity, multimodal supports, and conditions that sustain participation for pupils with SEN. In a longer-term perspective, the protocol can be extended with follow-up measures to explore an emerging 'Universal Design for Transition' orientation from primary school onward.

4. Conclusion

The design has limitations typical of school-based research in naturalistic contexts. First, class-level assignment and the limited number of schools constrain causal inference and generalisability; however, the aesthetic-control condition mitigates major alternative explanations linked to digital novelty and attractiveness. Second, the relatively short duration (20–30 days) supports feasibility and proximal outcome assessment but may be sensitive to novelty effects and short-term contextual factors. Third, PASS measures attitudes toward self and school rather than self-determination in a strict psychological sense; for this reason, the qualitative component is essential to support interpretation in terms of agency and future orientation. Finally, the use of derived indicators from narrative products entails interpretive choices that require transparency and methodological care; the combination with logbook process data is intended to strengthen credibility.

Despite these constraints, the project is relevant for three reasons. It responds to a system-level priority: making guidance an early and inclusive pathway consistent with national policy. It advances a model in which technology is designed as an intentional educational mediator, aligned with UDL principles, to expand access and support meaning-making for pupils with diverse profiles (CAST, 2018, 2024). Finally, it valorises narration as a formative device for inclusion, foregrounding children's right to represent themselves and imagine possible futures in school contexts (Gaspari, 2024). Overall, the proposed research design is intended to clarify the potential, mechanisms, and conditions of effectiveness of a UDL-oriented digital storytelling environment for early guidance in primary education, producing evidence useful both for educational research and for inclusive design practice.

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