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Coding for Liberal Arts:
From Technical Practice to Cross-Disciplinary Tool

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Abstract

The Coding for Liberal Arts research project is a media-educational study that explores the integration of coding and computational thinking into liberal arts education to enhance technical and disciplinary skills in primary school education. As part of the project, educational courses were implemented in classrooms to test and observe the proposed methodology. Each lesson was structured around the phases of the Scientific Method (Knowing, Hypothesising, Observing and Recording, Deducing), and four pedagogical pillars: Media and Digital Education, Competency-Based Education, Cooperative Learning, Experiential and Active Learning. The study followed an action-research model, involving approximately 450 students from 23 classes in public and private primary schools in Turin (Italy). Adopting a mixed-methods approach, the study combined qualitative text mining and quantitative analysis to capture both structured and unstructured data. These were collected using various tools (entry and exit tests, preliminary and final questionnaires, group-work outputs, teacher interviews, observation forms, and field notes) and analysed using Python to identify patterns and trends in students' learning experiences. Findings indicate that students successfully applied coding in liberal arts contexts, enhancing interdisciplinary understanding and problem-solving skills. Looking ahead, the results call for further exploration of coding-based methodologies across subjects and educational contexts. Although the PhD concludes in November 2025, the project will continue to address current limitations – particularly course duration and the inclusion of more Montessori-inspired activities. In conclusion, the research suggests that coding can be a valuable educational tool for fostering critical thinking, creativity, and cross-disciplinary collaboration, supporting the development of essential 21st-century skills.

Keywords: Computational Thinking, Digital Skills, Educational Robotics, Programming in the Humanities, Text Mining in Education.

1. Introduction

Society in the 21st century is witnessing the rise of *ubiquitous computing*: the growing integration of digital devices into every aspect of daily life (Marchignoli & Lodi, 2022). In this evolving landscape, the European Council highlights the importance of digital competence, which «involves the confident, critical and responsible use of, and engagement with, digital technologies for learning, at work, and for participation in society», as well as awareness of «how digital technologies can support communication, creativity and innovation» (European

Council, 2018). In this context, ISTAT data (2023; 2024) show that, despite some progress in developing digital competences, Italy lags behind other EU countries. This gap is particularly concerning in light of increasing automation: whereas it once threatened mostly low-skilled jobs, today the risk of replacement extends to all professionals (AbuMusab, 2024). These prospects underscore the urgent need to introduce, at all levels of education and training, activities that foster the skills needed in today's workplace.

Building on these insights, the *Coding for Liberal Arts* project was developed as a media education initiative grounded in the action-research model. It addresses a meaningful gap in educational research, namely the scarce attention devoted to coding within the humanities, a field still dominated by STEM-focused initiatives, and emphasises the dual potential of coding as a pedagogical and research tool. The project involved 447 students from public and private schools and it had a twofold aim: to explore how coding and the scientific method can be integrated into curricular hours dedicated to the humanities in primary schools, adapting a teaching approach previously applied only to STEM subjects (*Science*, *Technology*, *Engineering*, *Mathematics*); to employ the *Python* programming language for data analysis within an educational research framework. The study adopted a combination of quantitative and qualitative data collection tools – tests and questionnaires, student tracking sheets, assessment rubrics, observation grids, field notes, and research journals – providing a comprehensive view of the educational context before, during, and after the courses. Against this backdrop, this paper presents the theoretical framework, methodology, and implementation of the research, and offers reflections on its findings and implications.

2. Coding for Liberal Arts: Is It Possible?

Although educational robotics has been increasingly implemented in school programs, several misunderstandings in the field still hinder its conceptual clarity and effective application. Firstly, coding is often conflated with computer programming, whereas at its core, it refers to the application of *computational thinking* through *visual programming* tools to solve a problem (Bogliolo 2018). *Visual programming* is a method of representing processes through a sequence of blocks, each denoting a specific operation or action to be executed (Bogliolo 2020). *Computational thinking*, on the other hand, can be defined as the thought processes involved in formulating a problem, breaking it down into its constituent sub-problems, and constructing a solution (Ugolini, 2024). In light of these characteristics, *computational thinking* can indeed be regarded as «a fundamental skill for everyone, not just for computer scientists» (Wing, 2006, p. 33). Taken together, these conceptualizations indicate that coding goes beyond mere programming: it serves as a *modus operandi* that enables learners to structure and represent processes through sequences of actions, thus positioning itself as a versatile, multidisciplinary educational tool.

In line with this view, an increasing number of initiatives are promoting the use of coding as a transversal tool, extending beyond its traditional association with STEM subjects. Within formal education, digital storytelling is one of the most common techniques, as it offers the opportunity to simultaneously explore basic concepts of narrative and robotics through hands-on and playful activities (Tengler *et al*., 2021), showing how coding can support the early transversal development of cognitive, digital, and linguistic skills (Denicolai *et al.*, 2018). Alongside this widespread approach, many examples of the creative use of technology in education are gaining visibility, thanks to the use of resources ranging from platforms such as *Scratch* (Stoumpa *et al.*, 2021) or *mBlock* (Sacco & Monticone, 2025), to video games like *Minecraft* (Slattery *et al.,* 2024), contributing to the framing of coding as an effective tool for disciplinary learning in subjects such as History, Geography, English, and Italian. Yet, despite the substantial progress made in using coding as a cross-curricular tool within the liberal arts, currently, it is predominantly introduced in technical and scientific contexts with transversal effects on skills that are also relevant for the humanities, but only a limited number of studies have taken these disciplines as their primary context (Anwar *et al*., 2019; Arocena *et al*., 2022). However, viewing this practice exclusively through a scientific lens represents a narrow and limiting perspective: it reduces coding to a mere technical tool, failing to acknowledge its flexibility and its potential to foster critical thinking and problem-solving skills across a wide range of subjects (Sacco & Parola, 2024).

In parallel with its pedagogical applications, coding techniques are becoming valuable tools also in educational research (Romero & Ventura, 2020), with mounting evidence of their potential to collect, model, and analyse educational data (Estrellado *et al*., 2020), indicating that this competence is not confined to technical domains (Tikka *et al*., 2024), but rather represents a transversal skill capable of enriching educational inquiry, collaboration, and interdisciplinarity (Blanke *et al*., 2023), thereby fostering pedagogical innovation through a deeper understanding of learning processes (Siemens & Baker, 2012). In particular, the growing use of programming approaches in educational research can be attributed not only to its capacity to handle quantitative data, but also to its effectiveness in analysing large amounts of structured and unstructured text data through methods such as *Text Mining*, which combines natural language processing (NLP), statistical analysis, and machine learning to identify recurring patterns and extract key information (Macanovic, 2022), aimed at supporting decision-making and research processes (Ferreira-Mello *et al*., 2019). Although there have been advances in the use of robotic and AI-based tools, the use of programming for research purposes remains a niche area, notwithstanding its growing potential in both qualitative and quantitative terms (Wang *et al*., 2024; Rao & Chen, 2024).

Amid this evolving landscape, the PhD research project presented here – named "*Coding for Liberal Arts*" – aims to frame coding techniques as a means of analysing situations and modelling problems through the use of concrete and symbolic languages, answering the question: *Can coding serve as a flexible educational tool for developing both technical and disciplinary skills in liberal arts contexts?*

3. The Coding for Liberal Arts Research Project: Design and Methodology

The research presented here was developed with the aim of expanding a methodology originally designed to promote the application of computational thinking in STEM subjects and proved flexible enough to be extended to the humanities as well. Following this rationale, the general purpose of the *Coding for Liberal Arts* research project is to explore the potential for supporting the development of digital and disciplinary knowledge, skills, and competences in a primary school setting, during lessons dedicated to the humanities through inclusive, Montessori-inspired activities structured according to the *Think in Coding* methodology, which centres the learning process on the use of computational thinking and the scientific method (Vitti *et al.*, 2021).

The central assumption is that integrating coding as a pedagogical mediator – rather than treating it as an isolated discipline – and anchoring the learning experience in the scientific method can foster the development of disciplinary, media, and social skills even within the humanities, as has been documented in STEM education. To verify this hypothesis, the implementation of the study was organised into two segments, involving students from a variety of socio-economic backgrounds, ranging from upper-middle- to lower-middle-class contexts. The first phase took place from February to November 2023 at the *S. Teresa Institute*, a private primary school in Chieri (Turin), involving ten classes (187 students); pupils at this school had prior experience with coding, as they regularly used it during their technology lessons. The second phase was carried out from February to June 2024 in thirteen classes (260 students) from two public primary schools – the *A. Manzoni* and *E. De Filippo* – which are part of the *Comprehensive Institute Pacinotti* in Turin; pupils in these schools were approaching coding for the first time. Each class engaged in a customised programme designed according to the needs expressed by the teachers, both in terms of duration – ranging from six to fourteen hours hours – and curricular content – the subjects involved varied across the groups and included different combinations of Italian, History, Geography, and English – but in general, two types of learning pathways were proposed: pupils in the first, second, and third years participated in coding activities focused on storytelling and visuospatial skills, whereas those in the fourth and fifth years worked with programming flowcharts, used as a methodological framework and as a practical tool for addressing curricular topics and everyday problem-solving.

To ensure the reproducibility of the lessons, the courses were designed to be implemented using the equipment already available in classrooms – a computer and an interactive whiteboard, along with materials commonly found in schools or easily replicable – for example, in the storytelling activities, researchers provided a set of 10 *Code&Go* robots, which can easily be replaced with similar robots or even with a paper-based alternative. This versatility makes the model adaptable across different educational contexts, allowing schools with diverse resources to benefit from its pedagogical potential.

The study aimed to investigate students' learning achievements through a mixed-methods approach, which, by combining qualitative and quantitative tools, allows for a more in-depth and reliable analysis of the dynamics under investigation, as the complementarity of the two methods helps capture measurable outcomes and nuanced aspects (Trinchero & Robasto, 2019). A variety of tools were employed to assess the impact of the courses: *Pre- and post-questionnaires* to explore the liking index, social skills, emotional and cognitive dimensions, including learning strategies, collaboration, and self-reflection; *Entry and exit tests* to assess students' knowledge, abilities and competences related to the use of coding in humanities subjects; *Student tracking sheets* and *Group work products* to guide the lessons and monitor the ongoing impact on students' learning; *Observation grids*, adapted from Bales' (1999) *Interaction Process Analysis* (IPA), to systematically observe group dynamics; *Field notes* to capture qualitative observations and support quantitative data; *Research journals* to record reflections, observations, and insights throughout the project; *Photos, videos, audio recordings* to complement and deepen the data analysis; *Teacher interviews* to collect external perspectives on the effectiveness of the courses through semi-structured questions.

The tests, group activities, and assessment rubrics were primarily designed with reference to the works of Coggi and Notti (2002), Bonazza (2020), Porcarelli (2020), Trinchero (2018; 2022), and Castoldi (2023, A; 2023, B), while for the metacognitive questionnaires – which were fewer in number compared to the tests, as they were developed for the second year of the study – the main references were Di Nuovo & Magnano (2013), Cornoldi *et al*. (2018), and Roccato (2023) – the latter was also used for the teacher interviews.

As previously mentioned, alongside its educational dimension, the project also aimed to use the *Python* programming language as a tool for conducting data analysis; to this end, the assessment rubrics and IPA indicators were digitised and used as codebooks to guide the analysis process. The analysis of open-ended responses using *Text Mining* techniques began with *Sentiment Analysis* (Tan *et al*., 2023) aimed at classifying the collected textual data into positive, negative, or mixed emotional tones. At the end of this process, a *Thematic Content Analysis* (TCA) (Braun & Clarke, 2022) was conducted to identify recurrent themes and patterns within the comments. Concomitantly, the quantitative data were encoded through Likert-type scales or a binary system (0 = No; 1 = Yes). The data analysis was structured in multiple, interconnected phases to provide a descriptive overview by examining indicator frequencies, outlining general trends, and highlighting recurring challenges and response patterns useful for methodological refinement.

3.1 Pedagogical Foundations of the Educational Approach

As introduced above, the educational activities associated with this research were structured according to the *Think in Coding* methodology, which seeks to move beyond the logic of "teaching robotics" in favour of the less controversial stance of "teaching with robotics" (Parola *et al.,* 2021). In relation to this, the methodology does not refer solely to the educational use of coding but is primarily grounded in four key pillars: *Competency-Based Learning, Experiential Learning, Media Education,* and *Cooperative Learning* (Vitti *et al.*, 2020). Each uniquely contributes to shaping the educational approach proposed during this research project. Beginning with Competency-Based Learning, this pillar is considered central because, as emphasised by the European Council (European Council, 2018), in the 21st century «memorisation of facts and procedures is key, but not enough for progress and success. Skills, such as problem solving, critical thinking, ability to cooperate, creativity, computational thinking, self-regulation are more essential than ever before in our quickly changing society».

Consistent with this principle, the proposed methodology is designed on the assumption that every school lesson should be grounded in research, experimentation, and conceptual reconstruction, constantly connecting lived experience with informal and formal disciplinary knowledge (Porcarelli, 2020). In fact, an approach based on direct experience and supported by inductive and deductive stimuli can foster a meaningful connection between school knowledge and the individual's natural curiosity, promoting a type of learning guided by a scientific approach and rooted not in memorisation but in discovery and exploration (Cecchinato & Papa, 2016). From this perspective, teaching practices that encourage active learning become particularly relevant to the proposed methodology, as they involve students directly in constructing disciplinary knowledge through group simulations designed to address problem-based situations (Howell, 2021), echoing Montessori's idea that education cannot be acquired merely by listening to the teacher but emerges through personal and meaningful experience (Montessori, 2022, orig. ed. 1948). In harmony with this tenet, and in order to support the development of digital competence, the *Think in Coding* methodology has been structured to integrate digital education activities into every lesson.

The integration of this approach was feasible because it is not limited to the field of computer science: it concerns the incorporation of *Information and Communication Technologies* into everyday teaching practices, with the aim of fostering students' digital fluency and supporting the development of critical, responsible, and creative engagement with multimedia content (Rivoltella, 2019). Accordingly, Digital Education activities are generally based on the principles of educating *to*, *with*, and *through* technologies (Bocci *et al.*, 2022), in order to promote both critical understanding and active, hands-on learning, using technologies as «teaching mediation instruments, objects useful to reach the goals as, traditionally, the school did with the textbooks» (Sacco *et al*., 2020, p. 326).

To operationalise this vision, activities are commonly organised in two main phases: the first is the analysis, which involves breaking down a problem to understand its structure and the functions of its components; the second is a production phase, during which learning through practice is emphasised, allowing students to acquire disciplinary content in a contextualised, not abstract manner (Rogow *et al*., 2025). The production phase takes place through group work, which, by encouraging learners to see themselves not as passive recipients of instruction but as active agents in their own development, supports a pedagogy of equality and inclusion that brings together different abilities to work towards a shared goal, while valuing diversity as a resource (Rivoltella, 2019). When this dynamic is cultivated intentionally, it not only enriches the learning experience but also enhances academic performance and fosters a positive emotional climate in the classroom, reinforcing collaboration as an effective educational strategy (Johnson *et al*., 2015; Lyons, 2024).

These four key pillars are translated into practice through the organisation of the educational sessions, each of which was divided into four main stages that reflect the phases of the scientific method (Figure 1).

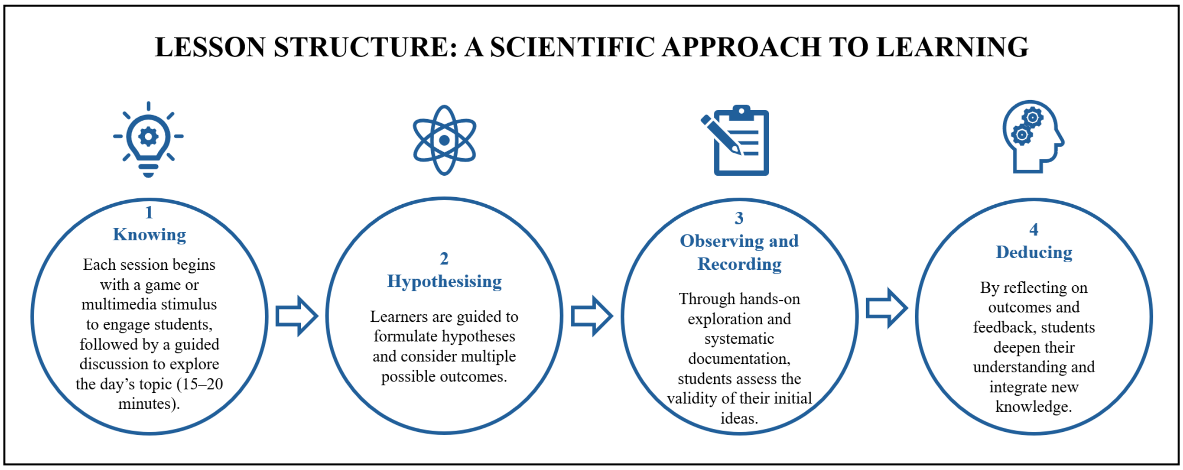

Figure 1. The 4 pillars and the scientific method integrated into the lesson (Sacco et al., 2020)

During the lessons, the teacher acts as a facilitator in the learning process, providing support and guiding students in building new competences through inductive and deductive approaches that challenge both prior knowledge and newly acquired skills (Vitti *et al*., 2020). Furthermore, to foster a collaborative experience within and across groups, activities incorporate the *Ask three, then me* rule: before turning to the teacher for a suggestion – not a complete answer – students are encouraged to consult three classmates in an effort to clarify their doubts together (Marchignoli & Lodi, 2022). Finally, to further support digital skills and a programmer-like approach, the methodology requires activities to be carried out in accordance with the *DigComp 2.2* framework (Vuorikari *et al.*, 2022), and requires students to engage in the implementation of the *Think-Make-Improve* cycle (Sacco & Vitti, 2025) (Figure 2), a learning approach aligned with the debugging process and the *Creative Learning Spiral* – which enables children not only "to learn how to code" but, more importantly, "to code in order to learn" by imagining, creating, experimenting, sharing, reflecting, and iterating their ideas (Resnick, 2017).

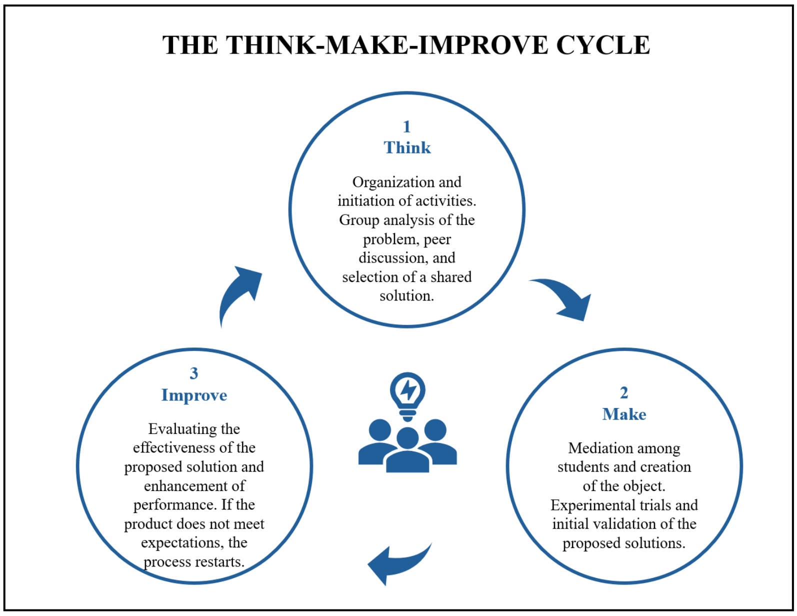

Figure 2. Coding approach to the lesson: the Think-Make:Improve cycle

The cycle allows students to design a solution to a given problem, test their proposal through immediate feedback, and use the collected data to refine their project (Sacco & Vitti, 2021), leading to the creation of a product that originates from a problematic situation, and helping students develop an awareness that trial and error can lead to the desired outcome (Vitti *et al*., 2020).

4. Results

The final tests were structured to assess the impact of the courses by monitoring the levels reached in terms of knowledge, abilities, and competences. Correspondingly, each test consisted of three sections: the first assessed students' understanding of theoretical concepts taught during the course; the second evaluated problem-solving abilities with exercises similar to those explored during the course; the third examined competence in approaching entirely new problems using integrated knowledge from different disciplines (Coggi & Notti, 2002; Bonazza, 2020). In terms of format, first, second, and third grade students received only closed-ended questions, while fourth and fifth graders also answered open-ended ones. To assess the effective impact of the courses, students were not required to study or complete homework in preparation for the tests.

The results of the final tests indicate that most students achieved at least intermediate levels in using coding within humanities subjects, although performance varied: participants with prior experience in coding significantly outperformed novices (Figure 3). Independent-samples t-tests and a one-way ANOVA confirmed significant differences ($p < .001$), with strong effects on knowledge ($t = 9.83$, $p < .001$, $d = 0.97$; $F(20, 357) = 6.61$, $p < .001$, $\eta^2 = .29$) and competences ($t = 8.95$, $p < .001$, $d = 0.86$; $F = 7.90$, $p < .001$, $\eta^2 = .33$); by comparison, the effect on abilities was significant but more limited in magnitude ($t = 4.77$, $p < .001$, $d = 0.19$; $F = 6.61$, $p < .001$, $\eta^2 = .29$), suggesting that prior experience had less impact on tasks closely resembling those practised during instruction. In turn, when considering only students with no prior experience, course duration emerged as the most influential factor: longer exposure was associated with significantly higher scores in knowledge ($\beta = 0.24$, $p = .003$; $F = 5.72$, $p = .018$) and abilities ($\beta = 0.42$, $p = .001$; $F = 8.23$, $p = .005$), while the effect on competences was not statistically significant in either analysis ($\beta = 0.14$, $p = .47$; $F = 2.77$, $p = .098$). Taken together, these findings suggest that short-term courses may support students' ability to successfully solve familiar disciplinary problems using coding techniques, but that the capacity to transfer such competences to more complex challenges appears to require longer and multidisciplinary exposure.

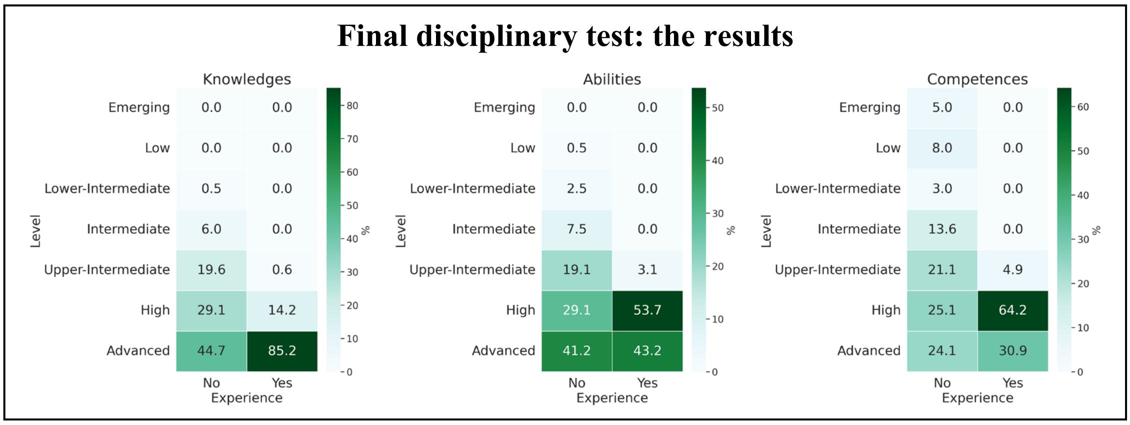

Figure 3. Effect of previous STEM coding experience on final test results

Moving on to the questionnaire, it was divided into two parts: the first included a series of Likert-scale questions to assess overall satisfaction with the course; the second part consisted of the *Childhood Adaptation Test* (TAI) – *Test di Adattamento nell'Infanzia* – a closed-response instrument developed by Di Nuovo and Magnano (2013), which presents interpersonal problem situations by means of illustrated vignettes. All classes received the same questionnaire, except that only fourth and fifth graders were asked to justify their Likert-scale answers with open-ended questions. The first questionnaire item assessed students' overall satisfaction with the project, and most responses were highly positive, but data disaggregated by class level revealed that satisfaction tends to decrease slightly with older students (Figure 4). In this case, *Challenge level* emerged as the most influential factor ($\beta = -0.274$, $p < .001$, $\eta^2 = 0.135$), with satisfaction decreasing in proportion to the increase in task difficulty (Spearman's $\rho = -0.406$, $p < .001$). Notably, the disciplinary test results showed only a weak correlation (Spearman's $\rho = +0.205$, $p = .005$) and were not a significant predictor ($\beta = +0.065$, $p = .311$, $\eta^2 = 0.006$).

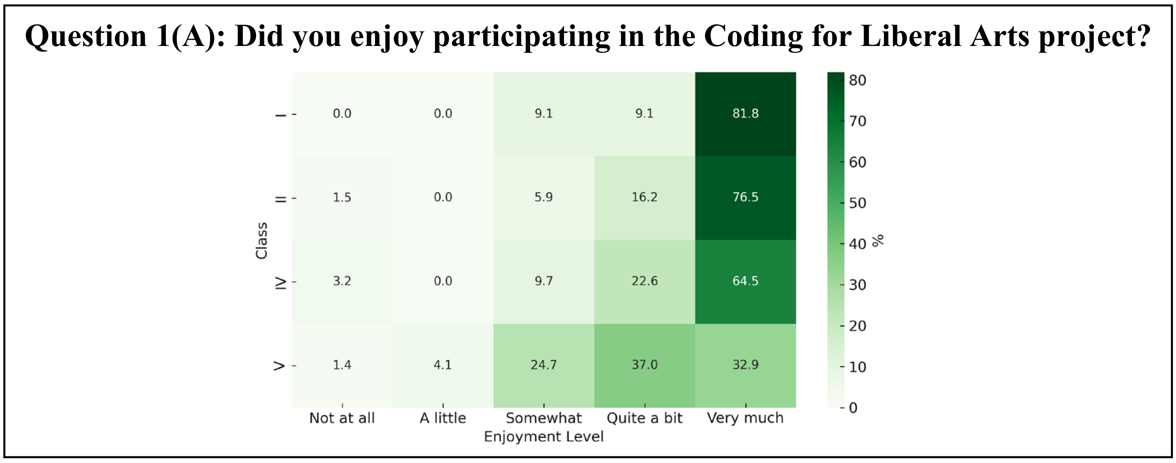

Figure 4. Satisfaction level of students in the final questionnaire

The analysis of open-ended responses from fourth and fifth graders provided deeper insights into the factors shaping their perceptions. As previously mentioned, the process began with *Sentiment Analysis*, and for the first item, which explored the reasons behind students' enjoyment, 68.9% of comments were fully positive, 13.6% fully negative, and 17.5% mixed. Subsequently, a TCA was conducted to further examine the nuances within students' feedback: responses were thematically organised to reveal how students experienced and interpreted the course, allowing their voices to be grouped into meaningful analytical categories (Figure 5) – for example, sentences like "*The lessons were interesting, but I thought we could use different types of robots*" were assigned to both the category *Interesting Lesson* and *Limited Technology*, while others, such as "*I liked the robots and learning things about coding, but I prefer math and science. I don't like History and Italian*" were categorized under *Topic Enjoyment* and *Subject Aversion*, reflecting a mix of appreciation and dissatisfaction.

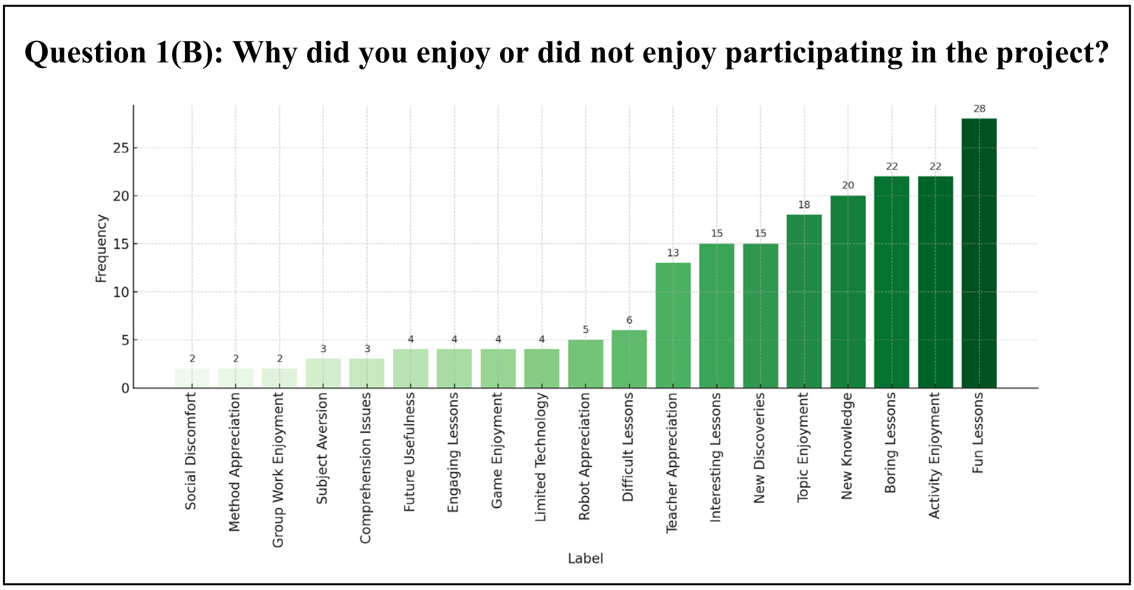

Figure 5. Qualitative comments explaining satisfaction with the course (Grades 4–5)

As the thematic analysis progressed, *Boring Lessons* emerged as the most frequent negative descriptor. A closer examination revealed that in eleven out of twenty-two cases, *Boring Lessons* was accompanied by positive descriptors – *Fun Lessons* (3), *Activity Enjoyment* (3), T*opic Enjoyment* (3), and *Interesting Lessons* (2) – communicating that the criticism was likely directed at specific lessons or activities, rather than the entire course; however, these responses did not specify why certain sessions were perceived as boring, similarly to the five fully negative responses in which *Boring Lessons* appeared as a standalone comment. In the remaining negative cases, this label was linked to aspects such as the limited use of technology (2), aversion toward certain subjects (2), and challenges experienced during the activities (2), indicating that perceptions of boredom were shaped either by structural features of the instructional design or by individual student preferences. In response to these insights, the lessons are currently being revised, drawing on the suggestions of the only Montessori-trained teacher involved in the programme, aiming to enhance the contextual relevance and interactivity of the sessions, thereby fostering greater student engagement and supporting more meaningful, in-depth learning.

Turning to more encouraging data, responses to the TAI items show a marked overall decrease in anxiety related to typical individual school situations, such as written tests ($p = 1.72 \times 10^{-9}$) and oral assessments ($p = 1.01 \times 10^{-15}$). While part of this reduction may be due to students' natural maturation over the six-month interval between assessments, the TAI data suggest a more substantial shift toward adaptive emotional regulation among fourth and fifth graders: in these classes, 30 students initially displayed performance anxiety, and 27 of them (90%) transitioned to active-adaptive strategies by the end of the intervention; in contrast, among first- and second-grade students, only 16 out of 33 (48%) showed a comparable improvement. This variation becomes particularly significant when considering that fourth and fifth grade students engaged with a complex programming approach, which demanded greater precision and frequent use of debugging processes: this analysis shows that even if a more explicit focus on programming techniques may sometimes be perceived by students as less engaging, it can still contribute to fostering a calmer and more confident learning environment.

4.1 Programming in Educational Research: Challenges, Advantages, and Opportunities

At the end of the data analysis process carried out in this research, it is possible to confirm that these computational tools can offer important support, but they also entail several limitations. Firstly, *Text Mining* allows systematic and scalable analysis of large volumes of structured and unstructured textual data, enabling the identification of recurring patterns and latent information through the integration of quantitative and qualitative approaches (Chandrasekar *et al*., 2024), and increasing efficiency in information-intensive processes by reducing time and workload (Haynes *et al*., 2019). On the other hand, meaningful coding requires constant oversight and active engagement from the analyst, as automated classification is still not sufficiently precise to capture the complexity of human natural language (Hacking *et al.*, 2023), particularly in terms of nuance, coherence, and contextual understanding (Liu *et al.*, 2024). However, this should be seen not as a drawback but as evidence that computational tools complement human interpretation, promoting a more rigorous and reflective approach to data analysis (Ergün, 2016).

In fact, beyond these contemporary limitations, the ability to translate qualitative data into machine-readable formats offers methodological and epistemological benefits in educational research: by converting qualitative material into analysable digital formats, researchers are encouraged to articulate their coding logic more clearly, to minimise interpretative vagueness, and to ensure internal consistency in their analytical framework, framing programming as a transversal skill able to support an enhancement for educational research (Blake *et al.*, 2023). These characteristics are earning computational approaches a more stable and integrated role within educational research, and as coding strategies continue to evolve, their application is expected to support more objective data processing while still preserving the interpretive depth required to grasp contextual and semantic complexity. In fact, the growing precision of machine-assisted analysis techniques can indeed foster the adoption of more conscious, evidence-based decisions in educational research and practice, guided not by arbitrary choices or purely automated outputs, but by a shared interpretive framework developed by professionals in the field (Ferreira-Mello *et al*., 2019).

5. Conclusions

In the current educational landscape, where digital education has assumed the same function as citizenship education (Rivoltella, 2019), the *Coding for Liberal Arts* research project proposes a replicabile model that incorporates educational robotics into liberal arts curricula, thereby valorising coding as a multifaceted educational resource, and challenging traditional disciplinary boundaries. Specifically, the overall outcomes of the research suggest that it is possible to address concomitantly disciplinary and robotics content during humanities lessons by centering the learning process on the use of computational thinking and the Scientific Method, and that this approach can support the development of disciplinary and digital knowledge, abilities, and competences, even if achieving optimal learning outcomes seems to require prolonged and multidisciplinary exposure. As these findings open up promising avenues for future research, the work will continue beyond the formal conclusion of the PhD in November 2025, in order to address the limitations identified during the experimental phase, with particular focus on course duration and the expansion of the target group, offering a model of digital education applicable across different contexts that recognises coding as a true language of our time, one that equips students with operational skills and interpretive tools to understand the mechanisms behind digital systems, while promoting a conscious and collaborative mindset where humans are not replaced by machines but instead regard them as valuable allies in improving the surrounding reality. In this sense, proposing a digital education centered on coding not only in STEM subjects but also in the liberal arts means providing students with disciplinary instruction alongside foundational training that is useful and transferable in today's society, where workers in every field are increasingly required to interact constructively with the latest technologies.

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