

Generative AI and its application in general and special education in middle and high schools. What fruitful hybridizations?

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Abstract: School is conceived as a place for learning knowledge and developing skills through curricula that address, on the one hand, administrative aspects and on the other, aspects that concern the individual who will be the protagonist of the educational process. These are not two separate, or worse, opposing, realities, but rather appear as complementary elements, as aspects that complement each other. This develops through a school that must increasingly become a laboratory of innovation. Therefore, teachers, as essential protagonists of instruction and education, must increasingly be: 1) capable of renewing curricula, planning teaching programs creatively and flexibly in light of each student's talents, gaps, and educational needs, in order to bring out everyone's potential.

Keywords: IA; Education; Curriculum; School; Teacher;

1.Introduction

The debate between general and special education is still ongoing, in a school context that in some cases remains stuck in the Gentile model, even though the framework is the autonomous school, which has increasingly placed schools at the service of students and the community. In this sense, schools are conceived as places for learning knowledge and developing skills through curricula that address, on the one hand, administrative aspects and, on the other, those relating to the individual who will be the protagonists of the educational process. These are not two separate, or worse, opposing, realities, but rather appear as complementary elements, as aspects that complement each other. This is developed through schools that must increasingly become a laboratory of educational innovation to promote the formation of the future digital citizen worker. It is clear that the teacher is responsible for adopting teaching methods to the subjects. Dewey had already considered these issues when he outlined the essence and purpose of the curriculum in relation to the child who should benefit from it. The teacher's task is to create a stimulating environment that can elicit a reaction, a response from the student, and at the same time guide him in the direction best suited to his natural intellectual and emotional development. In this regard,



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the curriculum plays a key role; indeed, it contributes, and not inconsiderably, to creating such an environment. In short, the teacher cannot avoid the healthy intention of connecting the material to the student's direct experience.

When considering a connection with ICT and AI, the educator's intervention is crucial, otherwise a significant opportunity for the child could be lost. The subject matter—now a discipline, like science, history, and art—is a tool for interpreting the child's nature and, at the same time, a means of guiding it in the right direction. "Guiding in the right direction" does not mean imposing a course of action, but rather bringing to full maturity something already present in the child that simply needs to be developed. In other words, the subject matter offers the teacher the opportunity to create appropriate stimuli and material that will serve as a support for the child's constructive experiences, that is, consistent with previous experiences. This support material can be constructed, in my opinion, using digital technologies and generative AI. For this reason, teachers, as essential players in education and training, must increasingly be: 1) capable of renewing curricula, designing creative and flexible learning paths that take into account the talents, gaps, and educational needs of each student, in order to bring out their potential; 2) capable of using technologies and digital technologies, as well as generative AI, in general, subject-specific, and special education teaching to foster metacognitive, and socio-relational learning processes.

The aim of this paper is to attempt to answer the following questions: What are the fruitful hybrids between teaching, educational technologies, and AI in our time? How can AI be used to apply it critically in education? What is the possible relationship between generative AI and general, subject-specific, and special education teaching? Have teachers been adequately trained to build inclusive interdisciplinary UDA through the use of digital technologies and AI? What is the impact of generative AI on teaching?

2. Curricula, technology, digital technologies, and generative artificial intelligence: what possible relationship can promote educational success?

The underlying issue many scholars from various disciplines are pondering is that AI must be used with great responsibility. It is undoubtedly bringing about a major revolution that will have positive and negative effects on the professional world, as well as on education. The emerging risk is that jobs will be lost tomorrow, but also the focus on widespread manipulation of people, who must be informed and receive rapid, perfect responses derived from algorithms that do not depend on them but on others who hold the information. Derrick De Kerckhove's reflection on psychotechnologies has already demonstrated how the alphabet can influence our visual orientation. According to De Kerckhove, a psychotechnology is any technology that emulates, extends, or amplifies the power of our mind. This is called connective intelligence, or interactive intelligence, which develops through the relationships and connections acquired through the Internet. However, today's advanced research focuses on training artificial intelligence (Fortino).

But what is its application in the educational field? Schools must increasingly become laboratories for educational innovation through synergistic co-teaching by teachers. John Dewey already argued that teachers, as researchers like doctors, must be able to diagnose problems and then design treatment with an educational plan that

is no longer individualized (Dewey, 1929), but personalized; 2) capable of implementing a skills-based teaching plan, starting from the curricula.

Organizationally, all this is possible in schools today through organizational, teaching, and curricular autonomy, as stated in Articles 4-5 of Presidential Decree 275/99. This allows teachers to experiment with the systemic organizational model through methodological-teaching, relational, and planning choices aimed at fostering peaceful human coexistence, a sense of belonging among people, and the valorization of diversity. To achieve this, it is essential to focus on the vertical curriculum, which rethinks curricula based on a skills-based approach to utilize tools accessible to all teachers in both the first and second cycles. This is because it has long been known that subject learning outcomes leave teachers “isolated in their planning,” without designing a comprehensive curriculum over the years that addresses the actual contribution each subject must make to achieving these skills, and how each teacher can actively participate in the class council. The vertical competency-based curriculum fits within the context of school autonomy, which presupposes: a) the centrality of the teaching-learning process; b) the shift from a focus on transmission to that of cultural mediation; c) the emergence of new responsibilities, roles, and tasks; d) the need to reconcile the professional cultural autonomy of each individual teacher with collegiality and cooperation. The most important thing to remember is that work responsibility is equally shared between teacher and students; the teacher plays a supportive role by encouraging reflection, while students, through active work, grow individually and socially. In this scenario, applied curricula must be transformed through teaching methods that leverage the mediation of technology and digital technologies, as well as generative AI, to promote educational success. In this regard, several questions need to be answered: How can we use AI in a critical and informed manner? Are teachers currently adequately trained in the use of generative AI? Are they familiar with the forms and languages of mediated education? What is the relationship between emerging teaching methods and technological mediation? What is the hybrid and dynamic space within which educational thinking develops?

3. What research questions?

This paper aims to reflect on the issues and problems outlined above in order to provide answers, building a framework from which to create a balance between content, methodologies, and the real needs of the educandus subject. This is achieved through a significant revision of the structuring of real, situational curricula, in order to develop in future teachers the ability to diagnose, address, resolve, and evaluate problems, as well as to pose them. The research will focus on a number of middle and high schools, where there is a growing need to understand the use, impact, and transformation of generative AI in educational processes. Therefore, this article aims to answer these questions through quantitative research based on a questionnaire administered to a large and representative sample of Sicilian middle school teachers, taking into account regional, size, and educational background variables.

We will therefore propose an exploratory descriptive investigation, conducted as part of empirical research on digital skills for curricular and inclusive teachers, to understand whether they are able to analyze and select textbooks and resources for students (both able-bodied and disabled) to study, or even co-create materials with students through the mediation of technology, digital technology, and generative AI.

They will also understand a progressive conceptual plan: what to address first, at the appropriate time and in a coherent manner, and what to address later, through a thorough planning of the “vertical curriculum.” They will also have clear criteria for concreteness, reuse, and systematization of content, that is, they will be able to develop the progression of concepts starting from simple and precise communicative situations. know how, within a framework of fruitful hybridizations, to reuse the concepts and tools learned, enriched by further learning and theoretical acquisitions and reused in more complex communicative situations, as well as knowing how to frame the concepts on a theoretical level (See, among others, Colombo, 2008; Margiotta, 2013; Pellerey, 2010; Tessaro, 2002; Ellerani, 2012) and that they know how to implement both the inductive and deductive approach to promote learning processes through mediated education. This creates a teacher who is both a classroom researcher and a participant in educational research (Brophy, Pinnegar, 2005). A mixed, inductive method will be adopted, following the paradigm of exploratory research—primary survey research on original data—and the questionnaire will be preferred to the interview, as it is traditionally and methodologically more impersonal. Regarding the sampling frame, a nonprobability, reasoned sampling will be implemented, using two criteria: the first refers to the selection of state and non-private schools, while the second stems from the consideration of analyzing the main types of digital technologies applied in primary and secondary schools, drawn from a numerically equivalent and representative sample of high schools, technical schools, and vocational schools, with reference to the sampled areas of Sicily. Furthermore, the aim is to construct a sample that: 1) has a balanced territorial distribution; 2) is representative of all school types; 3) contains best practices in which there is a high probability that the design model will be implemented under optimal conditions and cases that present critical issues of varying degrees and quality; 4) is also balanced with respect to the type of context (city center, hinterland municipalities, etc.). This sampling technique is, in fact, the most widely used in interpretive research strategies. The integration of the structured and semi-structured sections of the questionnaire with the “open” interview section will allow for a scientific investigation that gathers the most limited and quantitative responses from the most open-ended ones, thus still allowing for the possibility of highlighting some important elements or suggestions regarding the strengths and weaknesses of the use of generative AI and its application in general and special education in middle and high schools. Once this questionnaire collection phase is complete, the data will be coding. For data coding, the statistical processing program SPSS Statistics 22.0 from IBM SPSS (Statistical Package for Social Science) will be used. To this end, it is important to highlight how semi-structured and unstructured/open-ended questions can be aggregated, assigning them to labels representing frequent and ideal response types and categories.

4. Conclusions

Today's world assigns new roles to teachers, roles that require a new practical rationality, the ability to make decisions and continually seek new solutions to the issues posed by the constant changes in today's society, the ability to self-monitor, to pay attention to political issues related to education, to constantly and critically reflect on one's own experience, to clearly conceptualize why, where, and when a given activity achieves a specific objective of the curriculum guidelines. This research seeks to

rethink curricula according to a competency-based approach, enabling the use of tools accessible to all teachers in the first and second cycles. This is because the learning outcomes of the subjects left teachers "isolated in their planning," without designing a comprehensive and inclusive curriculum over the years, considering the actual contribution that the subject must make to achieving these competencies and how each teacher can actively contribute to the class council. The real challenge of skills-based teaching is the transformation of teaching methods, which requires a profound transformation of teachers' culture regarding the design of training courses and assessment in relation to digital technologies and generative AI.

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