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Introducing comprehensive sexuality education in Italian schools: from the co-construction to the evaluation of a pilot intervention

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Abstract

Introduction School-based comprehensive sexuality education (CSE) is a powerful tool that provides young people with information on all aspects of sexuality and is aimed at protecting their sexual and reproductive health and well-being throughout their lives. Currently, CSE is not integrated within the schools' curriculum in Italy. This study describes the co-construction, implementation, and evaluation of a CSE project piloted among students attending lower secondary schools, in four regions of Italy. Evidence-based evaluation will be helpful in promote the inclusion of CSE programs in the Italian schools' curriculum.

Methods The pilot scheme was co-constructed by a multidisciplinary curriculum development group through a Delphi process, including educators who conducted the activities. The evaluation followed three directions: the program (based on a literature review of CSE principles and recommended characteristics), implementation (assessing the execution of the program through the analysis of the reflection tools used by the educators), and short-term outcomes (assessing critical thinking and conscious behavioural choices through pre-post and satisfaction surveys).

Results The main goal, learning modules and content were defined and structured in five interventions with the students, and two with families and teachers. A total of 638 students were involved in the activity, across 11 schools. Data analysis of pre/post surveys reported a significant increase in knowledge in 12 of the 15 items investigated ($p < 0.05$), and a high level of satisfaction with the topics addressed. Qualitative analysis added information on the pivotal role of educators in CSE.

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Conclusions The national piloting of this educational activity provided positive insights regarding the co-construction, implementation and short-outcome evaluation, suggesting potential for scalability and future inclusion of CSE in the curricula of Italian schools.

Keywords Italy, Sexual health, School-based education, Comprehensive sexuality education, Evaluation

Introduction

Sexual and reproductive health (SRH) is a key element of the overall health and wellbeing of individuals. The improvement in people's sexual wellbeing also includes individuals' being able to make free and informed choices about their own sexual and reproductive lives, and to respect other people's decisions [1]. Sexual health and education are explicitly mentioned in three targets of the global 2030 Agenda for Sustainable Development, which has been signed by governments around the world (in particular, SDG Thematic Indicator 4.7.2 "Percentage of schools that provided life skills-based HIV and sexuality education within the previous academic year") [2]. The European Parliament recently encouraged member states to "ensure [that] sexuality education is taught comprehensively to primary and secondary school children, as SRH education can significantly contribute to reducing sexual violence and harassment" [3].

Comprehensive sexuality education (CSE) is defined by UNESCO as: "a curriculum-based process of teaching and learning about the cognitive, emotional, physical and social aspects of sexuality. It aims to equip children and young people with knowledge, skills, attitudes and values that will empower them to: realize their health, well-being and dignity; develop respectful social and sexual relationships; consider how their choices affect their own well-being and that of others; and, understand and ensure the protection of their rights throughout their lives" [4].

Systematic reviews have shown that effective school-based CSE programs improve knowledge and attitudes related to SRH and behaviours [5], increase self-efficacy related to condom use and contraception, reduce the number of sexual partners and may delay sexual debut [6], as well as reduce sexually transmitted infections (STIs) and unintended pregnancies especially when such programs include gender and power issues [7].

A recent systematic literature review [8] reported that CSE programs effectively promote a broad range of outcomes: (i) enhance appreciation of sexual diversity; (ii) prevent dating and intimate partner violence; (iii) promote healthy relationships; (iv) prevent child sex abuse in primary schools as well as improving disclosure skills and behaviours. Additional outcomes, such as social-emotional learning and media literacy, have been reported to have improved after participating in CSE programs. However, despite the amount of evidence available today, CSE is still not equally and widely available for young people in many countries [9].

In 2016, the Federal Centre for Health Education and the International Planned Parenthood Federation European Network [10] shared a report on the status of sexuality education in Europe and Central Asia. Out of the 25 countries investigated (Italy was not included), only 15 had a legal basis for teaching sexuality education (SE) in schools; of these, 10 reported a clear comprehensive approach. Finally, 8/10 countries had a monitoring and evaluation plan available, but which was rarely implemented. Given that school-based sexuality education (SBSE) in these countries is mostly integrated into broader subjects (e.g. life skills, health education), it is difficult to evaluate the outcomes resulting exclusively from SBSE classes. However, the report clearly states that the availability of SBSE in the countries investigated is closely associated with (very) low teenage birth rates and high levels of oral contraceptive use and does not hasten the initiation of sexual intercourse at younger ages [10].

Italy is one of a few European countries in which topics related to SRH and SE are not included in the school curricula or are addressed with a restricted biological focus [11]. Despite several attempts since the beginning of the last century [12], political, cultural and religious factors (e.g. myths about SE promoting early or promiscuous sexual behaviour, political opposition to the inclusion of LGBTQIA+ related topics, or the belief that SBSE denies parents the right to educate their children in accordance with their own values) [13] have prevented governments from introducing SE in the curricula in Italian schools. Currently, the decision to include SE among additional educational activities offered in schools is at the discretion of the school principals [11]. However, Italian students see schools as being the most appropriate setting for educating young people about SE [14–17].

Recent studies have attempted to map the implementation of SBSE initiatives in Italy [13, 18, 19]. Civil society organisations (CSOs), local health departments (LHDs) and individual professionals (e.g. sexologists, paediatricians, educators) have provided SE across the country, only partially filling the gap due to the lack of a national and standardised CSE program within the school curricula. Most initiatives have consisted of a single session, focused on sexually transmitted infections (STIs) and risk prevention, have provided informative rather than educational content, and were only offered in some parts of Italy [13]. Regarding content, one study found that SBSE activities implemented by local health departments in Italy tended to focus on the biological aspects

of sexuality, love and family, contraception and STI prevention, only marginally covering consent, human rights and disability [19]. Finally, although most SBSE programs were evaluated, the results were rarely accessible or published online [13].

Of the studies reporting on Italian SBSE programs published from 2000 to 2023: only one study evaluated pre/post knowledge [20]; one study evaluated pre/post knowledge with longer time span after the implementation [21]; two studies evaluated pre/post-test knowledge and reported sexual behavior using intervention and control units [22, 23]. All the studies reported improvements in knowledge but not in safer sexual behaviors (e.g. condom use).

According to Ketting et al. [24], the CSE evaluation should not only focus on public health outcomes and behavior changes, but should also include program content assessments, wellbeing indicators and aspects of positive sexuality, and it should rely on different information sources collected through mixed method approaches. In fact, CSE should not be a one-time intervention but rather a continuous learning process over the course of several years. Moreover, CSE is not designed to cause a shift in behavior but is focused on educative aspects, intended to "equip" individuals with "knowledge, skills, attitudes and values" to fulfill life, wellbeing, and face relational and rights issues [4]. Finally, unlike risk-oriented SE, CSE is based on a pedagogical approach in which 'sexuality' is considered in its complexity and not only a sexual act, and in which education transcend the sole provision of information [25].

For these reasons, the European Expert Group on Sexuality Education recommended that the evaluation of CSE programs should consider all the following: (i) program; (ii) implementation (or process); and (iii) outcome/impact [24].

This paper describes the process adopted for the co-construction, implementation and evaluation of the short-term outcomes of an SBSE pilot intervention (named EduForIST, henceforth the 'pilot') tested on adolescents attending lower secondary schools in four regions of Italy. Findings collected through this process will support fine-tuning and validation of the piloted intervention leading to scale-up within national territory, and will contribute to building a context-specific evidence-base for future CSE programs inclusion in Italian school curricula.

Methods

To develop, implement and evaluate the pilot intervention we followed several steps, namely: curriculum design, development of the syllabus and evaluation tools, implementation of the pilot activity.

Curriculum design

The pilot intervention was developed by a multidisciplinary curriculum development group (CDG), following European guidelines [26] as summarized in Fig. 1. The CDG was made up of 17 experts covering different competencies in the following disciplines: pedagogy, psychology, sociology, public health, and sexual health promotion. The experts belonged to academia, the Italian National Institute of Health (INIH), and CSOs with experience in conducting SBSE activities in Italy (supplementary material-Table A). To complement the partnership, an expert advisory board (EAB) of 15 members was set up, comprising representatives of professional organizations (e.g. the Italian Federation of Scientific Sexology), gynecologists, andrologists, pediatricians, obstetricians, psychologists, sexologists, anthropologists, youth and LGBTQIA+ activists. The EAB provided continuous input regarding the SBSE activity development, piloting and evaluation.

From February-June 2021, using a Delphi process, the CDG defined the main goal, target population, learning objectives and related content. The main goal of the pilot scheme was agreed through an iterative process based on the definition of CSE by UNESCO [4] and objectives of ongoing school-based activities [13]. A list of possible learning objectives and age-tailored content was selected from a comparative review of Italian/international guidelines [4, 27, 28].

Syllabus and evaluation tools

The SBSE syllabus development process lasted from July to December 2021 (Fig. 1). The pedagogists detailed the structure of the activity, grouped the objectives and content for inclusion into a single learning module (i.e. theoretical and practical training). The syllabus, developed by CDG (Fig. 1), catered for multiple learning styles. The content was presented through videos, PowerPoint presentations and interactive practical activities (e.g. role-playing, problem-solving approaches) which were contextually relevant and age appropriate. This included a checklist to be completed by teachers to gather information on school-related contextual factors and curricular CSE related topics. In addition, a content overview was created to be presented during meetings with parents/guardians and teachers.

The evaluation process was structured along three axes [24], as follows: (1) *program evaluation* was carried out through comparative assessment against existing body of evidence collated in an integrative literature review [29], and continuous review from EAB members; (2) *implementation evaluation* was carried out through two qualitative tools used by educators: a reflective journal [30] and a SWOT (Strengths, Weaknesses, Opportunities, Threats) analysis [31] aimed at promoting critical

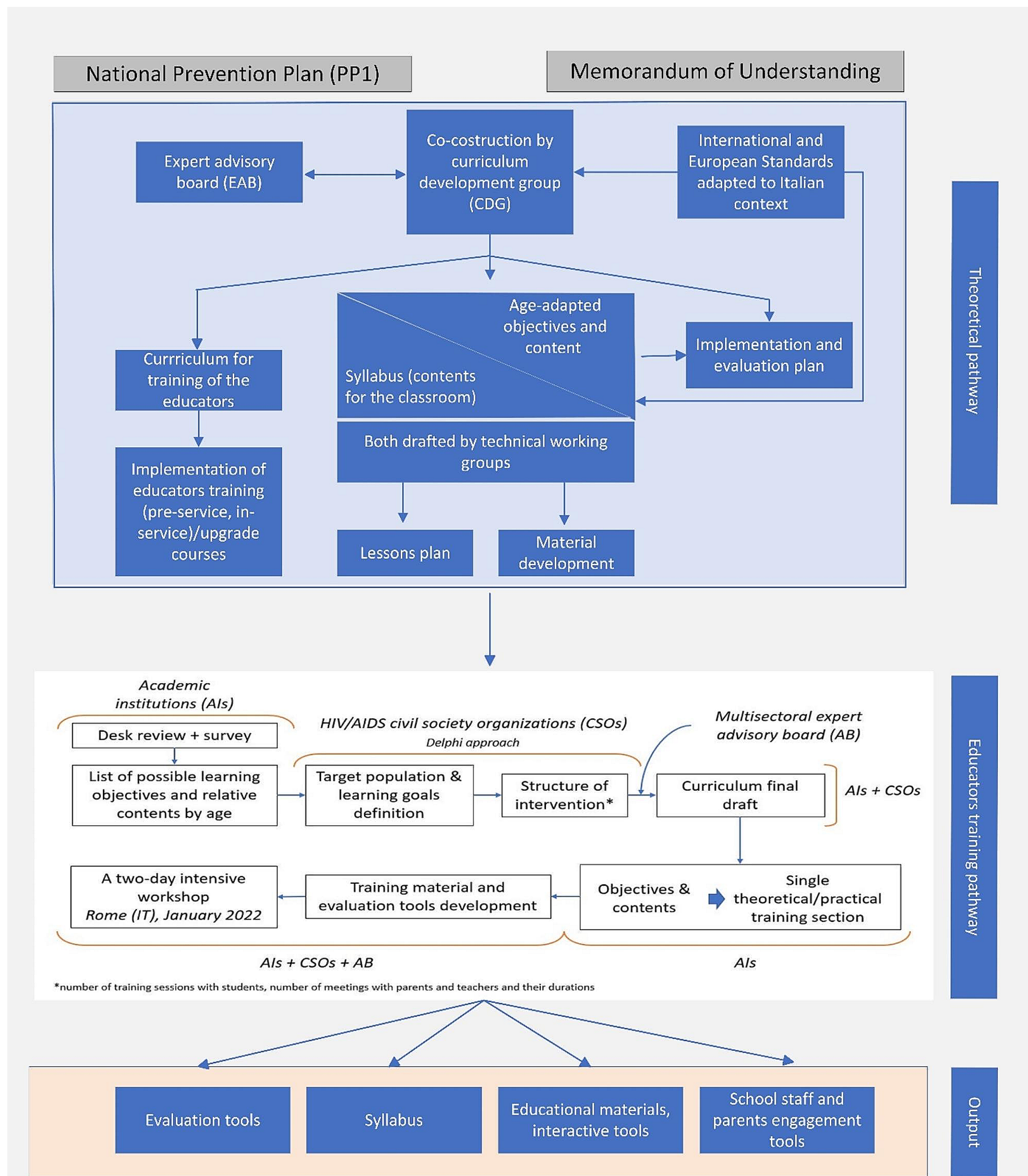

Fig. 1 Curriculum, syllabi, materials and evaluation tools development process. Pilot intervention in lower secondary school (second/third grade), Italy, February 2021 – January 2022. Adapted by Guidance for Implementation – Standards for sexuality education in Europe (WHO and BZgA, 2014) [26]

analyses of the educative pathway; data were collected and analyses using a qualitative approach [32], following a phenomenological approach [33]; (3) *Short-term outcomes evaluation* was done using a quantitative approach to assess pre/post knowledge and satisfaction questionnaires. Since education deals with the complexity of life, causal relationships among factors cannot be drawn and the outcomes themselves cannot be reduced to behaviours [34].

More in details, we approached the "implementation evaluation" proposed by Ketting et al. [24] from the pedagogical point of view to give value to what happened during the educational process during the interventions with educators in real life settings. We therefore asked the educators to write a reflective journal and/or a SWOT analysis report in which they narrated what happened during the activities with students from an educational perspective. They were asked to highlight the strengths, weaknesses, opportunities and threats arising from the actions (didactic level), and were invited to analyze their own "life of the mind" [35], i.e. their reflection on the quality of their own attitudes and "postures" towards to relationship with students and ethical issues that may have arisen (educative level).

Although cognition is only part of the human education process [36], it is one of the most important because thinking guides behavior [35, 37] and feelings [38]. We therefore measured impact as the improvement in adolescents' knowledge about sexuality using a quasi-experimental quantitative approach based on a pre/post-test design study. During the first session with the students, the pre-test questionnaire was administered to the students; likewise, at the end of the intervention, the post-test was administered based on the same questions included in the pre-test questionnaire, to ensure comparability. Knowledge improvement was evaluated using questionnaires developed ad hoc (supplementary Tables B-C). The questionnaires consisted of 15 statements covering all learning objectives with three response options (true, false, I don't know). Given the innovative nature of the pilot, these 15 statements were developed to reflect the content of each module and to draw conclusions about the effectiveness of the specific activities. The questionnaires were anonymous, and the correct answers were compared between the baseline and post-intervention for each class and school. The questionnaires took approximately 15 min to complete. Student satisfaction was measured though a separate questionnaire, made up of 9 items evaluated using a 3-point Likert scale (1=not very much; 2=neutral; 3=very much). The questionnaires were administered online or in paper format.

In January 2022, a two-day intensive workshop was held with CDG members and educators belonging to CSOs in order to: (1) pilot-test the syllabi and materials; (2) train the educators. Feedback was collected and the SBSE syllabi and materials were revised accordingly.

EduForIST pilot activity

Four regions in Italy were selected for the piloting, namely Apulia, Lazio, Tuscany and Lombardy, covering the south, center and north of the country. Participating CSOs in each region (Supplementary material - Table A) were self-organized in regional working groups (RWG), coordinated by a nominated focal point (FP). RWGs were responsible for contacting and recruiting lower secondary schools, covering urban and rural areas in the region (June-September 2021). Specifically, a non-randomized, opportunistic sample of schools was selected through a call for interest targeting school principals carried out by members of CSOs. Once selected, each of the participating schools identified at least one class to be part of the pilot intervention. Educators from different CSOs were grouped into heterogeneous pairs to promote the sharing of competences, cross-fertilization, and to foster comparability. The pilot intervention started in February 2022 and was completed in November 2022. Each intervention was preceded by a meeting with teachers and parents of the participating classes, led by CSOs educators. A post-intervention meeting was held with teachers and parents to gather insights and suggestions.

Data analysis

Qualitative evaluation data were analyzed through a qualitative approach, following a methodological cross-breeding between the phenomenological-eidetic method [39] and the Grounded Theory [40].

In the quantitative evaluation, questionnaires were analyzed using descriptive statistics. Categorical variables were expressed as counts and percentages in each category. In the pre/post-evaluation, the proportion of correct answers was expressed as a percentage with 95% confidence interval (CI) using the Clopper-Pearson method. Chi-squared or Fisher's exact tests were used to compare proportions between pre/post-training. For items in which improvements were recorded, multivariate logistic regression analysis was performed to evaluate whether school characteristics (geographical position: north vs. centre-south; context: urban areas above 50,000 inhabitants vs. rural areas; multimedia equipment: good vs. scarce) and having previously tackled some of the topics covered by the intervention were independently associated with the likelihood of correctly answering the post-intervention survey. A p-value of <0.05 was considered significant. The proportions of Likert scale answers were presented as percentages. Data analysis was performed using STATA 15.1 software.

In the present paper we focus on the short-term outcomes, showing the comparison of the pre- and post-intervention answers of the students, regarding the cognitive aspects of their learning.

Results

Co-construction of the pilot intervention

The co-construction process resulted in the definition of the following main goal for the pilot: "To build and promote scientifically accurate information that is appropriate to the age and development of students, respectful of

gender diversity, culturally relevant and transformative, on the physical, cognitive, emotional and social aspects of sexuality, which would be help develop attitudes and behaviors aimed at the prevention of sexually transmitted infections and the improvement of sexual health care".

The goal was broken down into a set of learning objectives and related content aimed at students aged 12–14 years (lower secondary school - second/third grade) as detailed in Table 1. The pilot consisted of five learning modules lasting two hours per session: four theoretical/practical sessions plus one student-driven content session. The first four sessions were organized as follows: 15-min "ice-breaking" games, 1-h presentation and 45-min skills-building activities. These sessions addressed: (A) acknowledging changes in adolescence, (B) handling emotions and relationships, (C) sexual identities and diversity, (D) sexual consent, STIs/pregnancy prevention, sexual health services. The evaluation questionnaires were administered during the first and last sessions. Separate meetings with teachers and parents/guardians were scheduled before and after student activities.

Evaluation of the pilot intervention

The pilot was conducted in 11 schools, for a total of 35 classes located in the four Italian regions (four schools in the north, seven in center-south). A total of 8/11 schools were in urban areas with over 50,000 inhabitants and 1/11 was in a disadvantaged area as defined by the schoolteachers involved. A total of 638 students participated in the pilot.

Analysis of the checklist showed that some aspects of CSE had already been presented to students in 4/11 schools, although none of the schools included sexuality education in their curricula. Multimedia equipment and internet connections were available in 6/11 schools. Educators reported that the parents/guardians involved in pre-intervention meetings welcomed the SBSE pilot in all the schools.

We followed the SBSE evaluation framework by Ketting et al. [24], comprising *program*, *implementation* and *outcomes*.

Program The program was based on the core principles of CSE as outlined by UNESCO [4] and BZgA-IPPF [27]. The CDG used an adapted version of the European Standards [27] to the cultural context in Italy to operationalize learning objectives and content.

Implementation The preliminary qualitative analysis of the data collected from reflective tools confirmed the effectiveness of the EduForIST intervention. In particular, it has allowed us to give value to the didactic tool and the educative attitudes and postures that the educators have considered as effective to adopt during the school meetings.

Educators recognized the project as effective because of the quality of the proposal both in terms of the knowledge imparted and the activities proposed. They considered as a central and strategic element the educational approach adopted, which was not limited to a transmissive view of knowledge and skills. More precisely, the approach took into account the complexity of the CSE issues and the ability to give value and trust to the relationships between educators and students. From the perspective of the skills required of them, educators stated that they were aware of need for pedagogical training, aimed at equipping them with educational elements, both theoretical and practical.

Table 1 Learning goals and relative contents included in the curriculum. Pilot intervention in lower secondary school (second/third grade), Italy, February 2021 – November 2022

Learning goals	Contents
To acquire correct information on sexuality, fertility, reproduction, and pubertal development; to recognise and positively accept changes and diversities as an expression of health and growth.	- Physical, emotional, social and psychological changes during puberty - Sexuality and its functions: reproductive, relational, and recreational
To acquire skills for the expression, recognition and management of emotions and feelings; to develop assertiveness in order to make informed choices and to respect oneself and others	- Emotions and feelings (friendship, love and physical attraction) - Different relationships - Consent and respect in relationships
To understand the main sex differences; to promote gender equity and respect for each individual, regardless of sexual orientation and gender identity; to prevent gender-based discrimination and violence	- Differences between biological sex, gender identity and sexual orientation - Cultural norms, stereotypes and gender roles
To reflect on the consequences of personal choices and behaviours; to promote a sense of responsibility towards one's sexual health and wellbeing	- Consequences of unsafe sex - Contraception options and their use - Sexually transmitted infections - Unintended pregnancies and voluntary pregnancy interruption - Stigma and discrimination - Sexual rights
To be competent in asking for help and support from trusted adults and health facilities/services how to ask help to adults and health services	- Psychosocial services for adolescents and pre-adolescents - Sexual health services for young people

As a cross-cutting and fundamental element of their reflection, educators identified the need to adopt a 'caring approach' to the whole process, placing children and the network of relationships in which they live (family, friends, school system, community) at the centre of educational activities.

Outcomes A total of 638 students completed the self-administered anonymous pre-test assessments, while 595 responded to post-test surveys. Participant demographics and characteristics, according to the school they attended, are reported in Table 2. Good levels of knowledge on changes in adolescence (domain A) at baseline were retrieved among students (item 1–3), while only 32.6% of them correctly stated that personal identity is built through social comparison (item 4). Significant improvements after piloting were found for items 2 (+6.7%, $p<0.05$) and 4 (+8.7%, $p<0.05$) of this domain. Regarding emotions and relationships (domain B), the proportion of students that correctly answered the question on feeling intense emotion during adolescence (item 5) rose from 61.4 to 68.9% ($p<0.05$), and the question on the role of empathy in building good relationships (item 6) from 74.4% to 83.4% (+9%, $p<0.05$).

Less than 65% of students correctly answered the three questions (items 8, 9, 10) on sexual identities and diversity (domain C) before the intervention, while this proportion significantly increased (+10.6% for item 8, +12.2% for item 9 and +11.9% for item 10, $p<0.05$) after the intervention. Similarly, levels of knowledge on STIs/pregnancy prevention (domain D) at baseline were extremely low among students, with only 35.1% of them knowing any symptoms of STIs (item 12), and 30.2% knowing about the effect of treatment on HIV infection (item 13). After the intervention, significant improvements were recorded for all five items of this domain, with +33.1% and +25.9% of students correctly answering items 12 and 13, respectively (Table 3).

Table 2 Student demographic and characteristics according to the school they attended. Pilot intervention in lower secondary school (second/third grade), Italy, February-November 2022

		Pre-intervention test assessment (*N.* 638)		**Post-intervention test assessment (*N.* 595)**	
		N.	**%**	**N.**	**%**
Sex*					
	Female	66	*10.3%*	105	*17.6%*
	Male	74	*11.6%*	121	*20.3%*
	Other	3	*0.5%*	5	*1.0%*
Geographical area**,¶					
	Central-South	377	*59.1%*	373	*62.7%*
	North	246	*38.6%*	222	*37.3%*
Urban areas**,¶					
	≤ 50.000 inhab.	151	*23.7%*	156	*24.9%*
	> 50.000 inhab.	472	*74%*	439	*73.9%*
Disadvantaged context**					
	No	605	*94.8%*	578	*97.1%*
	Yes	18	*2.7%*	17	*2.9%*
Teachers' favorable approach to the intervention**,†					
	No	0	*0.0%*	0	*0.0%*
	Yes	623	*97.7%*	595	*100%*
Parents' favorable approach to the intervention**,†					
	No	0	*0.0%*	0	*0.0%*
	Yes	623	*97.7%*	595	*100%*
Multimedia equipment and internet connection**,¶					
	Poor	252	*39.5%*	245	*41.2%*
	Good	371	*58.2%*	350	*58.8%*
Sexual health aspects discussed before the intervention**,¶					
	No	132	*20.7%*	138	*23.2%*
	Yes	491	*77%*	457	*76.8%*

N.: Number of students that answered the test. %: Proportion of students

* Information not available for N. 495 (77.6%) pre-test and N. 363 (61%) post-test; ** Information not available for N. 15 (2.3%) pre-test

† According to the opinion of the educators that conducted interventions

¶ Variables included in multivariate analysis

Table 3 Student knowledge pre- and post-intervention on the four domains addressed with the pilot intervention in lower secondary school (second/third grade). Italy, February-November 2022

Domain of training section	Investigated item	Pre-intervention test assessment (N. 638)			Post-intervention test assessment (N. 595)			dif. %	*p*
		N.	%	95% CI	N.	%	95% CI		
A. Acknowledging changes in adolescence	1. Everyone goes through important changes during adolescence (**True**)	586	91.8	89.7–94	559	93.9	92-95.9	+2.1	>0.05
	2. The timing of physical changes during adolescence is the same for everyone (**False**)	531	83.2	80.3–86.1	535	89.9	87.5–92.3	+6.7	**<0.05**
	3. Feeling insecure is common during adolescence (**True**)	510	79.9	76.8–83	497	83.5	80.5–86.5	+3.6	>0.05
	4. A person's identity is built through comparisons with others (**True**)	208	32.6	29-36.2	246	41.3	37.4–45.3	+8.7	**<0.05**
B. Handling emotions and relationships	5. Feeling intense emotions is rare during adolescence (**False**)	392	61.4	57.7–65.2	410	68.9	65.2–72.6	+7.5	**<0.05**
	6 Empathy, the ability "to put yourself in another's shoes", is fundamental for building good relationships (**True**)	475	74.4	71.1–77.8	496	83.4	80.-86.3	+9	**<0.05**
	7. Wanting to be part of a group is a common experience during adolescence (**True**)	542	85	82.1–87.7	519	87.2	84.5–89.9	+2.2	>0.05
C. Sexual identities and diversity	8. A person's gender identity (that is, feeling male, female, or else) is defined by what society expects from that person (**False**)	361	56.6	52.7–60.4	400	67.2	63.5–71	+10.6	**<0.05**
	9. Sexual orientation is defined by which gender/sex of persons an individual feels romantically or sexually attracted to (**True**)	412	64.6	60.9–68.3	457	76.8	73.4–80.1	+12.2	**<0.05**
	10. A stereotype is a rigid and generalized opinion (**True**)	340	53.3	49.4–57.2	388	65.2	61.4–69	+11.9	**<0.05**
D. STIs/pregnancy prevention	11. You cannot catch a sexually transmitted infection during first sexual contacts (**False**)	390	61.1	57.3–64.9	450	75.6	72.2–79.1	+14.5	**<0.05**
	12. The need to pee often with burning may be a symptom of a sexually transmitted infection (**True**)	*224*	35.1	31.4–38.8	406	68.2	64.5–72	+33.1	**<0.05**
	13. There are drugs that allow people with HIV not to get AIDS and not to transmit the infection to other people (**True**)	193	30.2	26.7–33.8	334	56.1	52.1–60.1	+25.9	**<0.05**
	14. Birth control pills protect against sexually transmitted infections (**False**)	277	43.4	39.6–47.3	370	62.2	58.3–66.1	+18.8	**<0.05**
	15. Pregnancy is not possible during the first sexual intercourse (**False**)	440	69	65.4–72.5	472	79.3	76.1–82.6	+10.3	**<0.05**

N.: Number of students that correctly answered the test. %: Proportion of students. Dif.: difference in proportion between post- and pre-test. p: *p*-value

Living in a region of northern Italy improved the rate of correct answer for item 14 "*Birth control pills protect against sexually transmitted infections (False)*" (domain D, $p<0.05$, SM Table D). Attending a school located in an urban area increased the chance of post-intervention correct answer to items 10 (domain C) and 15 (domain D, $p<0.05$, SM Table D). Availability of good multimedia equipment reduced the probability of correctly answering items 2, 4 (domain A), Item 5 (domain B) and item 14 (domain D, $p<0.05$, SM Table D). Conversely, having previously approached some of the topics before the pilot improved the likelihood of post-intervention correct answering item 2 of domain A, item 5 of domain B, item 8 of domain C and items 11 to 15 of domain D ($p<0.05$, SM Table D).

A total of 538 students completed the satisfaction survey. Each topic was considered very interesting by more than two thirds of the students. Mental changes during adolescence and STIs prevention were the favorite topics, with 79.1% of students reporting a high level of interest in discussing them. Emotions, gender identity and sexual orientation elicited lower levels of interest (31.1% and 28.8% of students reported being "neutral", Fig. 2).

Discussion

To the best of our knowledge, this study is the first time a multidisciplinary intervention of SBSE with a CSE approach has been developed for secondary schools in Italy.

Given that there is no national approach to SBSE in Italy, our aim was to gather and organize evidence, best practices and previous experiences within an intersectoral and multi-disciplinary group of stakeholders to develop a new, standardized and comprehensive CSE intervention. The CSO group was highly heterogeneous, mirroring the Italian scenario with respect to SE-related educational activities [13, 19], comprising faith-based, social-justice, patient-based organizations pursuing a

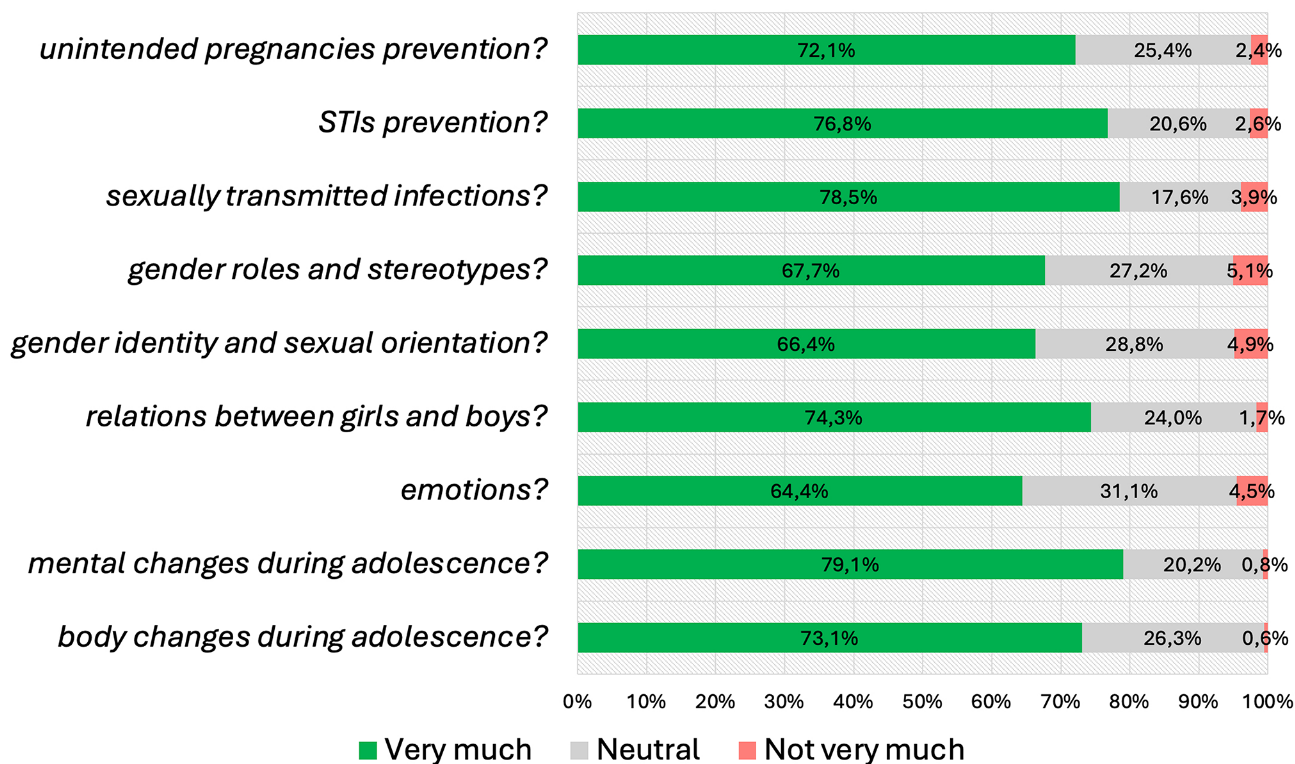

Fig. 2 Student satisfaction after the pilot intervention in lower secondary school (second/third grade). Italy, February-November 2022

range of different objectives. Grounded on the diversity of the group, debates and discussions within the CDG led to an overall consensus, with a shift from a risk-based towards a CSE-based theoretical approach, in line with existing recommendations [4] and evidence of impact [8].

The implementation evaluation underlined that the shift towards a CSE-based approach was effective in deeply engaging students in the educational process. According to educators and in line with existing guidelines [4, 27, 28], CSE implementation requires dedicated training and tailored monitoring activities to ensure continuous improvement and adaptation to students' changing needs. Well-developed curriculum can only achieve an optimal impact if the educators delivering it are knowledgeable, able to facilitate open, respectful, non-judgmental discussions, and employ participatory learning approaches [41]. This is fundamental as the sustainability and affordability of quality SBSE activities may require the active engagement of schoolteachers to ensure scale-up at national level. However, dedicated training for these professionals in Italy is currently lacking, and worldwide the topic is seldomly covered in university curricula [42] [43],

Comparing these types of results is particularly difficult as research on CSE predominantly concerns health outcomes or adopts psychological models linked to behavioral change [25]. Adopting, as we have done, a pedagogical view requires conceptual and methodological approaches that are scarcely present in the scientific literature. Such pedagogical approaches are geared toward valuing long-term learning and the quality of the interactions, relationships and educational activities that take place in the classroom [29]. More generally, the lack of rigorous research on implementation is due to the preference for evaluating educational practices from the perspective of outcomes measured via quantitative metrics. To the best of our knowledge, our approach to assess the educational experience of SBSE actually lived by educators and students through rigorous qualitative research is unique. We aim to fill a gap in SE research by assuming the principle of educational research [44], that suggests an educational pathway for collecting data to understand its pedagogical quality. In line with this perspective and in response to a real need of educators, a second level objective that our research intends to pursue is therefore to advocate the creation of databases of good practices validated by rigorous research processes.

According to international guidelines [4, 27, 28], SBSE should cover all school grades starting from primary school. Given limited resources available, our pilot targeted lower secondary schools, on account of average age of sexual debut in Italy (around 15 years). Despite the

broad geographical scope of the project, only a limited number of schools were involved. This may have implications on the representativeness of the findings and on their transferability to the entire country. Furthermore, our approach involved active participation by the students during the implementation and evaluation phases, but not during program design. This may explain lower reported interests in a few of the topics proposed. Involving students throughout might have resulted in a yet higher level of interest.

In our study, most of the students significantly improved their knowledge related to what they learned during the intervention. Equally important, they reported high levels of satisfaction towards the topics addressed and the didactic approach (e.g. ice breaking games and interaction with external experts). This is in line with existing studies analysing students experiences in SE, identifying active participation as a key factor to foster empowerment and decision-making capacity [24]. In particular, a recent study (SETARA [45]) implementing a CSE intervention based on UNESCO guidelines in Indonesia, looked at program and short-term outcome evaluation of knowledge and attitudes related to SRH and found similar positive effects of the intervention on key skills such as contraception, HIV and gender attitudes. More in general, according to recent literature, strategies for evaluating the quantitative outcomes of CSE interventions should consider multiple dimensions encompassing learning, health and social outcomes, requiring a complex evaluation framework [46]. Currently, these strategies vary widely in terms of target population, study design, and outcomes [8], and a robust and common evaluation strategy is still lacking.

A long-term impact evaluation of CSE on health and wellbeing remains a challenge [46] and was not addressed during this project, mainly due to short observation time, the limited number of schools involved, and lack of standardised indicators. To overcome these limits, indicators of long-term impact [47] will be developed during further implementation.

The main purpose of this study was to create, implement and evaluate an evidence-based SBSE pilot activity (EduForIST) across Italy as a flexible, adaptable and feasible model of CSE intervention. Our findings show that the piloted EduForIST intervention may provide a standard for future implementation of CSE activities in schools in Italy, as well as informing future policy decision and building a stronger case for the introduction of SBSE in school-curricula.

Supplementary Information

The online version contains supplementary material available at https://doi.org/10.1186/s12889-024-19610-7.

Supplementary Material 1

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Data availability

The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

Declarations

Ethics approval and consent to participate

The study was conducted in accordance with the Guidelines for Good Clinical Practice and the ethical principles that originate in the Declaration of Helsinki and within the Italian law. The study protocol was approved by the Institutional Review Board at University of Pisa. Informed consent was obtained from all subjects and/or their legal guardian(s). More in detail, the pilot scheme was approved by the school councils and included in the annual plan. School principals obtained parents/guardians approval for the extra-curricular educational activity via a written informed consent form. Data were provided and analyzed anonymously.

Competing interests

The authors declare no competing interests.

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