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Title: Examining LGBTI+ Inclusive Sexual Health Education from the perspective of both youth and facilitators: A Systematic Review

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Abstract

Objectives To synthesise the evidence in relation to the receipt and delivery of LGBTI+ inclusive sexual health education.

Design A systematic review and narrative synthesis.

Data sources A systematic search of three online databases (EMBASE, PsychINFO and SocINDEX) from January 1990 and November 2019 was conducted.

Eligibility criteria Studies included were (1) Peer-reviewed; (2) English; (3) Quantitative and qualitative; that evaluated (4) sexual health in an educational or online setting; and (5) focused on training or educating. Studies were excluded if (i) the population was not LGBTI+ inclusive; (ii) the studies were based in philosophy or theory; or (iii) the study was not available in full text.

Data extraction and synthesis The studies that met the inclusion criteria were assessed using the Critical Appraisal Skills Programme (CASP) tool. A narrative synthesis was then completed employing content analysis focusing on the results section of each article.

Results Of the 2523 records retrieved, 19 studies met the inclusion criteria. The majority of studies noted that both LGBTI+ youth and those who facilitate sexual health education are turning to online sources of information. Current sexual health education programmes operate mainly from a heterosexual perspective, creating a sense of exclusion for LGBTI+ youth. This is compounded by a lack of training, or provision of an inclusive curricula, resulting in facilitators feeling ill equipped or inhibited by their personal biases.

Conclusions LGBTI+ youth are not experiencing inclusive and comprehensive sexual health education. Poor access to information, training and resources remain the primary reasons. There is a need to standardise sexual health curricula, making them LGBTI+ inclusive and incorporate holistic aspects of health such as pleasure and healthy relationships. Online approaches should be considered in the future, as they represent equality of access for both sexual health education professionals and LGBTI+ youth alike.

Strengths and limitations of this study

- The search strategy conducted utilised three distinct search engines to access journals with a biomedical, behavioural, and socio-cultural focus.
- A robust method of synthesis was employed examining both qualitative and quantitative approaches of any methodological design addressing LGBTI+ participants or educational training.
- The review includes only published, peer-reviewed studies in English and is thus susceptible to publication bias.
- It excluded grey literature (reports, conference proceedings or dissertations) and was limited to research from 1990 onwards.
- The voices of youth who identify as heterosexual and/or cisgender were not considered when determining the definition of inclusive sexuality education.

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Keywords Systematic review, training, sexual, health, sexual health, inclusive sexual health education, LGBTI+ sexual health, online sexual health.

1. INTRODUCTION

Sexuality is an activity of daily living and a unique and important aspect of an individual's overall health [1]. Adolescent sexual activity has increased in recent decades leading to an upsurge in sexually transmitted infections (STI's) and unplanned pregnancies according to the World Health Organisation (WHO) [2]. The low uptake of STI screening among adolescents is a major public health concern, with research highlighting a lack of education and long waiting times at clinics as the most common contributing factors [1]. Lesbian, gay, bisexual, transgender, intersex, and all other sexualities/genders (LGBTI+) have been shown to be at increased risk of negative sexual health outcomes, including physiological factors and discrimination [3]. In order to combat these disparities, sexual health education and training has been proposed to build capacity around LGBTI+ issues [3].

Comprehensive sexual health education has been shown to delay the onset of sexual intercourse, reduce the incidence of human immunodeficiency virus (HIV), and reduce sexually transmitted infection rates among young people [2, 4]. However, this has historically been conducted from a heterosexual perspective [5, 6]. Studies have shown that early sexual experiences of LGBTI+ youth are different than their heterosexual counterparts and many feel the sexual health information delivered in schools does not directly relate to them and frequently disengage [7, 8].

Relationships and Sexuality Education (RSE) education is presently under review in Ireland, with the current syllabus having been implemented in the 1990's in response to concerns surrounding adolescent pregnancy [4]. The syllabus focuses less on sexual health or sexual identity education and more on "relationships education and marriage preparation" [4]. Research indicates that when LGBTI+ sexuality is included, it is regarded as largely unhelpful by LGBTI+ youth due to a lack of appropriate LGBTI+ terminology and sexual health specific language such as gender identity e.g. cisgender and transgender [6,7].

Language is not the only barrier in discussing sexuality, same sex practices and desires. Facilitators and educators have reported feeling less confident about discussing LGBTI+ issues due to a lack of resources and training on sexual health [5,7]. As a result, the information provided to LGBTI+ youth varies greatly across educational settings based on the facilitators own values and comfort with the subject [6,8]. For example, where facilitators were embarrassed to make mistakes in relation to discussing LGBTI+ pronouns or explaining different genders such as non-binary, many chose not to talk about these topics at all [6,8].

There is a need to understand best practice with regard to the delivery of inclusive sexual health education and to develop appropriate training for professionals [6]. Evidence is needed to develop

strategies that improve access to LGBTI+ inclusive sexual health resources and training. The aim of this review is to synthesise the evidence available in relation LGBTI+ sexual health education for young people aged 16-23 years from the prospective of both the LGBTI+ youth and the professionals who deliver sexual health education in order to understand how best this can be improved.

Definitions

Young People- The term 'young people' for the purpose of this article refers to individuals aged between 16 years to 23 years. This age bracket represents the average ages for teenagers attending second and 3rd level education, also referred to as high school and college level education, who would be in receipt of sexual health education that covers sexual identity and sexual intercourse.

Facilitators- The term 'facilitator' is used for the purpose of this article to refer to those delivering sexual health education. This encompasses teachers, educators, trainers and any form of professional who delivers sexual health education.

2. METHODS

2.1 Search Strategy

A comprehensive literature search was conducted utilising a range of databases including EMBASE, PsychINFO and SocINDEX. These were systematically searched for literature published between January 1990 and November 2019. Each database was searched in a 24-hour period using predefined search terms. This ensured a wide range of results, representative of international best practice. Due to the nature of this type of research, ethical approval and review was not required.

2.2 Study Eligibility and Selection

Articles published in English between 1990 and 2019 were included in the review if they were (i) peer reviewed journal articles; (ii) related to sexual health in an educational or online setting; (iii) focused on training or educating. English language content was chosen to ease assessment by a native English-speaking researcher. Peer-reviewed content was employed to identify international best practice regarding sexual health training methods and educational approaches. Both quantitative and qualitative studies were included to ensure a robust representation. Publications beginning from 1990 were chosen as this tracked sexual health development following the 1988 finding that Irish Law prohibiting homosexual activities were in breach of The European Convention on Human Rights [9].

Articles were excluded from the review if: (i) the population was not LGBTI+ inclusive; (ii) studies were based in philosophy or theory and/or (iii) the study was not available in full text. Subsequent studies were deemed ineligible following inspection of the abstract. The final step involved reading the full

text of each article in order to identify the final group of studies to be included. A PRISMA flow diagram presents the results in Figure.1.

2.3 Quality Appraisal

19 papers were critically appraised to ascertain the alignment of the research aim and methodology, and to evaluate the recruitment, settings, data analysis, ethical issues, findings, and contribution to knowledge. The individual studies were assessed for quality using the Critical Appraisal Skills Programme (CASP) tool [10] (See Table 1).

Table 1 Summary of studies included in the review

Source	CASP Score out of 10	Country Where Study Undertaken	Population and setting	Method/ data gathering	Aims/ Objectives	Key Findings
Glikman & Elkayam, (2019)	8	Israel	Students enrolled in various departments of a teacher-education college (n=264) Participants' mean age was 31.6years	Quantitative Used Surveys-Questionnaire	To understand the beliefs of college students on the importance of discussing the issue of sexual orientation with pupils, and in different educational settings.	-School counsellors were considered to be the most appropriate figure to discuss sexual orientation with students -Having witnessed homophobic behaviour enhanced the importance of education around this topic -Education students are not well informed on the subject of sexual orientation, either in terms of general knowledge or the tools available to them
Donovana & Hester, (2008)	7	United Kingdom	Four focus groups with lesbians, gay men, heterosexual women and men; and 67 interviews with heterosexual women and men, and those with experience of same-sex relationships regardless of how they defined their sexuality.	Multimethod research project Nationwide Survey-followed by Focus groups and Interviews	To compare love and violence in heterosexual and same-sex relationships.	-There are a limited number of places where young people can learn about relationships -Young people thinking about exploring alternate sexualities require inclusion in sex and relationship education

						-Need to focus on ideas, beliefs and expectations of love, care, equality, power, and intimacy regardless of gender and sexuality
Mustanski et al., (2014)	5.5	USA (online)	LGBTQI+ Youth aged 16-20 (n= 202)	Mixed methods Pre-test survey Intervention 2 weeks later- Post-test survey	To assess the feasibility, acceptability, and initial efficacy of an innovative online sexual health promotion program tailored for LGBTI+ youth.	-Participants reported learning more in this online programme then in school-based sex education -Most improved areas of learning reported were in relation to sexual functioning, HIV and STIs, and contraceptives
Buston &Hart, (2001)	7	Scotland	25 schools (non-denominational) co-educational state schools 60 lessons, teachers (n= 173), Pupils (n=7630)	Multi method evaluative study SHARE programme delivered over 3-year period (intervention) Or Sex Education "as usual" (control)	To establish if a specifically designed teacher led Sex Ed programme would reduce sexual risk taking.	-Heterosexism in school sex education does exist -Teachers report not having the language to discuss inclusive sex and sexuality education - Constraining factors to including LGBT in sex education identified at both school and societal level -Teachers own values prevent them from delivering non-heterosexist sex education
Rhodes, (2004)	6	United States (online)	Male chat room users (n=619) Web address and chat room name not published to protect participant identity	Mixed method Intervention 6 hours per day in chat group Chat transcripts analysed and coded for themes Demographic data analysed using SPSS	To explore an online intervention to reduce sexual risk in a chatroom frequented by men who have sex with men (MSM).	-Many men expressed interest in sexual risk reduction information -Chatters comfortable asking questions due to anonymity of online chatroom -Health educator was able to provide information on testing locations

						-Information sought from chatters in relation to: Coming out, youth resources, STI screening and condom use.
Hillier & Mitchell, (2008)	9	Australia	Same-sex-attracted youth (n=1749) 14–21 years old	A self-complete survey either online or in printed format Analysed Quantitative using SPSS Qualitative was coded in Excel	To examine whether same-sex-attracted young people are being exposed to appropriate and relevant sex education at school, and if they are not whether it is necessary that sex education be inclusive of sexual difference.	-Many of these youth were sexually active at an earlier age than their heterosexual peers -They were five times more likely to report having been diagnosed with an STI than their heterosexual peers -Accurate knowledge about STIs and pregnancy is needed
Gowen & Winges-Yanez, (2013)	9	Oregon, United States	LGBTQI+ participants (n=30) in two LGBTI youth organisations in Oregon	5 Semi-structured focus groups Digitally recorded and transcribed for analysis and coded into themes	To examine perspectives of LGBTI+Q youth on their experiences with school-based sexuality education in order to create a framework of LGBTI+Q-inclusive sexuality education.	-Current sexuality education is very exclusive of LGBTQ youth -Participants wish to experience discussions regarding gender and sexual orientation in order to feel directly acknowledged -No part of the existing curriculum was suggested for subtraction, only some additions and reframing of current materials was proposed
Baams et al., (2017)	7	Utrecht, Netherlands	Dutch adolescents (n=601) from 6 different high schools in grades 10-12 Representing urban, suburban, and rural areas	3 wave longitudinal research project The first wave was conducted in Fall 2014, followed by two subsequent measurements after 4 and 8 months This study focuses on the	To examine whether the content or extensiveness of sexuality education at the beginning of the school year is related to a decrease in LGBTI+Q name-calling and an increase in the willingness to intervene when witnessing LGBTI+Q name-calling at the	-Sexual orientation and gender are rarely covered in sexuality education -There is a need to cover resources and how to access services in sexuality education - Teachers are believed to feel inadequate to

				first and third measurement waves.	end of the school year.	teach about sexual diversity
MacMaster et al., (2003)	4	California, United States	Asian and Pacific Islander MSM in Santa Clara County, California. Number of participants and demographic data was not provided	Qualitative chat room discussions	To test the impact of an Internet based outreach to "high risk" MSM living in Santa Clara County.	-Successfully demonstrated the feasibility and impact of an internet-based programme to reach often over-looked at risk populations -Programme resulted in 46 referrals for HIV testing
Formby, (2011)	9	England, United Kingdom	Findings from 3 small studies drawn together LGBTI+ youth (n=375) aged 13-23 years	Qualitative Self-completion surveys and/or in-depth interviews/focus groups	To examine influences on sexual activity, conceptualizations/ understandings of sexual health and 'safe sex', and expectations in relation to safer sex.	-Young people would like discussion and information on same sex relationships in SRE -Ways to improve provision include well informed external speakers -Alcohol and drug use was a factor in sexual decision making -There is a need for appropriate sexual health information, and access to safer-sex supplies -Internet key to accessing sexual health information
Lindroth et al., (2017)	8	Sweden	Descriptive statistics from web-based survey (n=796) and qualitative interview study with transgender people (n=20) Total n=816	Mixed Methods Descriptive statistics from a previous web-based survey and previous qualitative interview study with transgender people were combined.	To explore and describe holistic sexual health and sexual health determinants among transgender people in Sweden.	-Not being able to fully live sexually as one wishes, and being dissatisfied with one's sex life have implications for everyday life -Access to gender confirming operations is described as a vital component for sexual health -Feelings of anxiety, uncertainty or fear in sexual situations

						hinders sexual health -More than one third reported not knowing where one can be treated with respect while getting tested for HIV and other STIs.
Sherlock, (2012)	5	Sweden and Ireland	Sexuality education professionals in Ireland (n= 17) and Sweden (n=17)	Qualitative Interviews	To examine the Socio-political influences on sexuality education in Sweden and Ireland.	-Both countries complain of sparse teacher training, curriculum updates and programme reviews -More research, discussions and engagements with sexuality education issues are needed in Ireland and Sweden -Policy barriers (religious) and gaps in curricular implementation require urgent attention and funding in both countries
DeHaan et al., (2013)	8	United States (online)	LGBTI+ youth (n=32) Ages 16–24	60-90-minute semi structured Interviews Transcribed into EthnoNotes a mixed method analysis program	To investigate the interplay between online and offline explorations of multiple dimensions of sexual health, which include sexually transmitted infections, sexual identities, romantic relationships, and sexual behaviour.	-LGBT population more likely to turn to the internet for information and connection -Internet is the main source of information -Youth actively searched online for offline services such as testing, Doctors and LGBT sensitive services -Youths open to receiving information online
Hobaica & Kwon, (2017)	8	Washington, United States	N=12 people from sexual minorities (SM) Sexual minorities included: lesbian, gay, bisexual, queer, pansexual, demisexual, and asexual	Qualitative study, 40-90 minute semi-structured interviews	To explore sexual minorities experiences of sexual health education.	Heteronormative sex education may contribute to poor physical health outcomes for SMs. -Participants reported that inclusive sex education would concurrently benefit

						heterosexual students -Inclusive curricula would increase self-esteem and confidence for SM students -Importance of incorporating role models of various identities into curriculums to reduce negative stigma
Riggs & Bartholomaeus, (2018)	9	Adelaide, Australia	Seven videos by transgender young people (n=5) aged 18-25	Analyse discussions of intimacy from the perspectives of transgender young people as narrated in a sample of YouTube videos	To examine what transgender young people would like to see covered in sexuality education.	-Sex education needs to address sexuality and gender, extending beyond heterosexual norms -As potential friends, classmates and intimate partners of their transgender peers, cisgender students should be educated in an inclusive manner -Educators and sex education programmes must develop ways of talking about bodies and intimacy with a more diverse approach to understanding gender and embodiment.
Abbott et al., (2015)	8	United Kingdom	8 semi-structured interviews with Relationship and Sexuality Education (RSE) teachers (n=2)	Qualitative discursive psychological approach used to analyse interview data	An Analysis of How Teachers Uphold Heteronormative Sex and Relationship Education	-Teachers reported those who engage in same sex relationships as isolated -Teachers require regular updating of their knowledge around sex, sexuality and issues affecting young people -Teachers need to be made aware of ways in which they

						can promote inclusivity
Hoefer & Hoefer, (2017)	7	Texas, United States	N=16 students at a southwestern University who identified as one or more of the following: female, LGBT, or person of colour	Qualitative recorded in-person interviews	To examine the impact of abstinence-only sex education curricula	-Particularly prevalent were messages in this education about women, LGBTQ and sex as shameful and scary -These messages left long lasting impacts on the way participants felt about themselves, their peers, and sexuality. -Refusal to discuss LGBTQ issues allowed students to move into adulthood feeling confused and guilty
Halyey et al., (2019)	9	Seattle, United States	Transgender and nonbinary (TNB) youth (n= 11), parents (n=5) and healthcare affiliates (n=5) from Seattle Children's gender clinic	Qualitative In-depth interviews analysed using thematic analysis	To use insights of TNB youth, parents of TNB youth and healthcare affiliates to understand deficits in sex education experienced by TNB youth.	-TNB youth have unique sex education needs that are not commonly covered in standard sex education -Inadequate information leads TNB youth to seek information from potentially inaccurate, unfiltered sources -Negative outcomes had been experienced by many participants including STIs, pregnancy, unsafe binding, unsanitary sex toy use, and shame about their bodies and sexual desires Sex education needs to be inclusive and may need reframing to be trans-inclusive
Cahill et al., (2019)	9	United States	Youth Serving Professionals including: Adolescent health providers, school nurses, youth	Qualitative study	To explore barriers and facilitators that professionals face in delivering HIV	-Educational materials should be free, disseminated in a variety of formats (online and downloadable),

			workers, and school educators (n=34)		preventive services and education.	and evidence based -Tools should be specifically designed for youth and should involve peer education and use popular technologies -Training programme needs to include basics about sexual orientation, gender identity, and approaches for HIV risk reduction to enable the provision of affirming services

2.4 Data Synthesis

The papers comprised qualitative and quantitative study designs. There was a large degree of heterogeneity between included studies, a number of which we single cohort ore-test post-test in design. It is not appropriate to conduct meta-analysis on studies that are at risk of bias or are too diverse, as the results can be misleading [11]. As such a narrative synthesis technique was employed, utilising the Popay et al. (2006) framework [12]. Narrative synthesis uses words and text to summarise and explore data from both quantitative and qualitative studies. Recommendations were followed about using specified search methods and organising the output as a synthesis, to 'tell a story.' The results sections of each paper were analysed by all three authors to identify evidence of the impact of sexual health education in a variety of contexts. First, a preliminary synthesis was developed. The same relevant data were extracted from all papers and tabulated. A content analysis with an inductive approach was then conducted which allows themes to emerge from the data (See Table 2). Two co-authors (MOF and MPD) proposed and defined categories following analysis. Any discrepancies were discussed with a third author (PC).

Table 2. Study Content Analysis

Content		**Study Reference Numbers**																	
Category	Themes in Data	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32

Online Learning	Students and facilitators seeking information online	√	√	√	√	√	√	√	√				√	√	√	√	√	√	√
	Need to utilise popular technologies e.g. YouTube		√											√					√
	Web based/ Free online resources		√		√			√			√							√	√
	Internet acts as educator/ facilitator/ information source				√	√	√	√			√			√	√		√		√	
	Equity of Access			√			√		√						√			√		√
	Anonymity Online for users								√						√			√		√
	Unaware where to access reliable info online		√		√	√								√	√					
Sexual Health Programme Components	Include different genders and sexual orientations	√	√	√	√	√		√	√	√		√	√	√		√	√	√	√	
	Intimacy and Relationships	√		√					√			√				√	√			
	Contraception and STIs		√	√	√	√						√					√	√	√	
	Inclusive and supportive- Not heteronormative	√	√	√	√	√			√	√		√	√	√		√	√	√	√	
	Physical and emotional health		√	√								√					√			
	Students 'see themselves in curriculum'	√			√	√			√	√			√					√	√	
	Terminology and language important	√			√			√						√		√	√			
	Signposting to support services	√		√	√					√			√			√		√	√	
Facilitator Attributes	Facilitator characteristics e.g. Interpersonal Skills, listening skills	√		√			√			√			√		√	√				√
	Personal bias/ core values			√	√			√		√	√	√			√			√		

	Comfort and ability to address issues of gender and sexuality			√	√		√			√	√	√	√			√				√
	Feel unable/ not confident				√			√			√	√	√					√		
	Knowledge of sexual health information	√	√				√			√			√		√	√			√	√
	Tone and delivery important	√		√				√	√	√			√			√				

In order to establish trustworthiness in the analysis, well-grounded methods, including thick description of the findings and maintaining a detailed audit trail were utilised by all three researchers. The narratives were read once before coding began for the researchers to familiarise themselves with the data. The researchers then coded the results section of each paper before these codes were grouped and summarised. These codes were then compared across authors and the relationship between codes were considered, in some cases leading to the amalgamation of separate categories under a superordinate group. Note that counting was not routinely applied in analysis, as a count is considered to convey that all codes warrant equal weighting [13].

2.5 Patient and Public Involvement

Patients and the public were not involved or required for the completion of this study.

3. RESULTS

3.1 Study Descriptions

The final nineteen studies included ten qualitative studies [14-23], two quantitative [24-25] and seven mixed methods study designs [26-32]. Eleven of these focused on the experiences of LGBTI+ youth in various educational settings [16-18, 21, 23, 25, 26, 28, 29, 31, 32]. One referred to youth of all sexualities including heterosexual [22]. Four examined professional experiences of delivering sexual health education [14, 15, 22, 23]. One examined the impact of abstinence only sexual health education [16] and one examined sexual health online interventions in a men who have sex with men (MSM) chatroom [30]. Three main categories were derived from the content analysis: 1) Online Learning, 2) Inclusive Programme Components, and 3) Facilitator Attributes.

3.2 Online Learning to Facilitate Accessible Equitable Sexual Health Education

The virtual world enables instant access to information at the touch of a button. Educators and youth alike were shown to be turning to online resources to seek out and access information on sexual

health. Fifteen studies showed that young people are seeking sexual health information [14-21, 23, 25-27, 29, 31, 32]. Of particular note, was the fact that young people are open to receiving information virtually, are familiar in engaging with online platforms, and are shown to learn effectively through this medium [14, 16-21, 23, 28-32].

LGBTI+ Youth

For LGBTI+ youth online access to information represents equality of access. Online sexual health information was shown to afford LGBTI+ youth control over their sexual health needs, allowing them to self- educate on topics not covered in traditional heterosexual focused sexual health education such as gender identities, sexualities, and surgical and non-surgical interventions for transgender individuals [17]. Specifically, LGBTI+ youth were shown to turn to the internet due to the value they place on their anonymity [17, 18, 20, 21, 27, 31]. This was described as being of significant importance for youth who report not seeking answers in group settings for fear of being inadvertently 'outed' [17, 19, 26].

While many LGBTI+ youth reported viewing the Internet as their main source of information in relation to sexual health, relationships and sexuality (Hillier), they were also shown to actively search online for a diverse range of offline services, including HIV and STI screening, where to purchase contraceptives and LGBTI+ friendly services [14, 16, 17, 20, 21, 25]. The ability to access sexual health information online was shown to result in increased wellbeing for LGBTI+ youth [32], who report poorer levels of sexual health education and higher levels of dissatisfaction with their sex lives [29,30].

Not only does internet based sexual health education provide accessible and equitable sexual health outcomes for LGBTI+ youth, but seven studies also outlined the benefit of online education as a means of accessing difficult to reach and overlooked populations such as those in rural or remote locations [16, 17, 18, 20, 30, 32]. Another advantage of an online platform was the ability to interact with young people in real time. Where a chatroom-based intervention was offered, this uniquely allowed tailored messages to be provided to meet the specific needs of the young people [30]. Some disadvantages were also noted such as the ambiguity for LGBTI+ youth on the best source of accurate, information online [27].

Facilitators

Eleven studies found that facilitators were also seeking information and training tools online due to the lack of LGBTI+ inclusive information, resources, and training in the sexual health curriculums [14-18, 20, 23,29- 32]. They reported a need for web based and downloadable teaching resources, with the suggestion that sexual health websites have links to offline materials and supports [15, 16, 19, 20,

30-32]. There was a lack of awareness on the part of facilitators as to the best sources of information online, with an emphasis placed on the need to be able to download and transfer these resources to the education setting [16, 20, 30, 31]. Akin to LGBTI+ youth, facilitators also highlighted the need for trustworthy resources and online sources of information online, suggesting the need for a one stop website for all sexual health enquiries and training [15, 16, 20, 31].

Online learning

The majority (n=11) of the studies concluded that online learning was both possible and highly effective [14, 15, 18-20 23, 25, 29, 30, 32]. The results demonstrated the feasibility and potential impact of internet learning when consideration is given to a number of factors including internet connection, and that accuracy/bias of the source [17, 31]. In fact, LGBTI+ students in particular were shown to learn more form online than in school (15, 16, 18-20, 25, 30-32].

In order for online learning to be as effective as possible a number of design elements were highlighted across the studies. The visual attractiveness of online platform was noted as important as it was key to engaging users and relaying the information [23]. Nine studies referenced the need for an online site to provide links to offline materials and supports, along with free resources disseminated in a variety of formats such as downloadable [15, 16, 18, 20-24, 32]. Two studies suggested utilising existing sites used by LGBTI+ youth such as YouTube, as a way of offering information online that would reach specified groups, providing them with accessible and equitable access to information [15, 32].

3.3 Inclusive Sexual Health Education- Programme Components

Overall, LGBTI+ youth reported dissatisfaction with the information included in sexual health education curriculums. The nature of sexual health education reported by participants across studies was predominantly heteronormative [14-22, 26-28, 31].

Current Sexual Health Components

Current sexual health education focused on vaginal intercourse, pregnancy prevention and marriage. As a result, many LGBTI+ youth reported they felt the course material was not relevant to their lives. Sexual diversity in terms of sexuality, same sex relationships, and identity were not included in the majority sexual health education topics [14, 16, 22-24, 28, 29, 32], with restrictions described on topics such as sexual pleasure and what constitutes 'healthy' relationships [29]. Participants across studies described sexual health education as only focusing on the biological standpoint and lacking context

[16, 29]. This resulted in LGBTI+ youth feeling vulnerable, unaccepted and 'less than' their heterosexual peers [18, 22, 24].

Current sexual health education was also reported to focus on a medical and/or disease prevention methodology [20, 29]. While the majority of respondents across surveys reported receiving sufficient information to protect themselves against HIV and STIs [16, 18, 22-26, 28, 23, 32], transgender respondents in particular were unaware of services they could access where they would be treated with respect and understanding while getting an STI screening [16, 23, 29]. Four studies found that young people were not given basic information about their bodies, reproduction or contraceptives [17, 19, 23, 29]; with some being advised to use condoms without ever being shown how [19, 29].

A common theme across studies related to LGBTI+ invisibility, marginalisation, or exclusion [14, 16, 20, 22, 23, 27, 30, 31]. Where LGBTI+ youth sought to be informed on relevant issues, they were reportedly met with what they described as 'homophobia', whereby facilitators failed to signpost LGBTI+ youth to relevant services or community groups [14, 16, 20, 22, 23, 27-31]. As such many LGBTI+ youth described feeling isolated and ashamed of their sexuality and unaware of where to seek support and often reduced their engagement in any sexual health education [17, 20, 23, 27, 29, 31].

The assumption that all youth are heterosexual immediately separates the information as not personally relevant for many same sex attracted young people, resulting in their disengagement [16, 23, 26]. Three of the studies found that LGBTI+ young people were unable to transfer the information they needed from classes on safe heterosexual sex to their own practice [16, 23, 26]. Notably, this was not the case in reverse, whereby heterosexual youth remained engaged when sexual health information was delivered in an inclusive format [19, 23, 24]. In fact, the inclusion of LGBTI+ topics in sexual health education was shown to reduce stigma, foster self-esteem and limit negative mental health outcomes for LGBTI+ youth [14, 16, 17, 23, 31].

Components required for Inclusivity

The programme components required for inclusive sexual health education were discussed across studies. Sixteen studies found that sexual health education needs to encompass more than sex, puberty and pregnancy information [14-20, 23-31]. Topics identified for inclusion into LGBTI+ inclusive sexual health included same sex relationships, LGBTI+ terminology, aspects of LGBTI+ questioning and signposting to services [14, 16-20, 24-27]. There is also a need to provide information regarding sexual orientation, gender identity and approaches for STIs [15, 19, 20, 26, 27, 31], condom use [16, 18, 21- 23, 28] and HIV risk reduction [16, 21, 22, 30]. Twelve studies proposed that not only physical but emotional aspects of sexual health need to be discussed with young people to provide a holistic

approach to sexual health education [14-18, 21-24, 26, 29, 31]. This would include discussing relationships, love and communication and creating awareness around feelings of anxiety and uncertainty [14-19, 23 28, 31]. In order to promote inclusivity, the use of resources representing sexual diversity in the classroom was considered paramount [14, 17-20, 22-31].

Four studies indicated that youth who experienced education on respectful intimate relations were validated in who they were and reported an overall positive effect on their sexual health experiences [16, 19, 23, 28]. LGBTI+ young people were shown to have increased wellbeing as a result of seeing themselves in the curriculum [18, 22, 29]. Some studies identified the need to distance the discussion of relationships from gender and heterosexuality, and instead focus on beliefs, expectations of love, care equality and intimacy regardless of gender [15, 17-19,23, 28]. In addition, six studies found that transgender youth needed more in-depth information around gender affirming interventions both medical and non-medical e.g. binding and 'bottom surgery' (this is a form of gender affirmation surgery for a transfeminine person) [14, 23, 27, 29, 31].

Eleven studies reported that the tools employed for inclusive sexual health education should involve peer education, resources with youth representation, and popular technologies [14-18, 20, 23, 25, 30-32]. To improve the provision of services, fifteen studies pointed to the need for well-informed external speakers or educational resources [15-19, 21-24, 26-30, 32]. These studies also addressed the need for education materials to be evidence based, free, and disseminated in a variety of formats, including online [16, 22, 28, 29-31, 32]. Six studies elucidated the importance of taking account of learning styles and promoted learning in different ways such as role playing, discussion, and watching videos [16, 20-24]. Three studies addressed the need to discuss what Is perceived as important by youths in smaller groups [16, 20, 21]. These also highlighted the benefit of mixed groups where applicable to allow for the integration of all genders and sexualities [16, 20, 21].

In order to build capacity, the need for practical demonstrations and communication around condoms to reduce risky decision making was considered of particular importance [14, 16, 17, 19, 23, 28, 29, 31]. Approaches across eight studies identified common multidisciplinary needs and identified ways to equip professionals to deliver effective sexual health education [14, 16, 17, 21, 23, 28, 31, 32]. In particular, they noted the need for the implementation of policies to reduce sexual health disparities, and the introduction of a standardised curriculum whereby professionals are equipped with appropriate knowledge relating to sexual health [17, 21-23, 28, 31].

3.4 Defining Facilitator Attributes for Inclusive Learning

Personal values, comfort levels and access to information and training can impact on facilitator ability to deliver inclusive sexual health education. In a school context, educators were reported as crucial in creating an inclusive environment and in setting the tone for the way discussions are held [14, 15, 19, 21-25]. Current facilitators often complained of sparse teacher training, and lack of curriculum updates for their poor knowledge and comfort levels in relation to delivering comprehensive sexual health education [15-25, 27], with this argument used by some to justify a need for external facilitators [17, 21, 25].

Negative Attributes

A large percentage of studies found facilitators were ill equipped to talk about sexual health with young people due to their own discomfort with the subject matter combined with a lack of training [14, -17, 21, 22, 25-27, 29]. Particular attributes were identified as being unhelpful in the delivery of inclusive sexual health information. These included a lack of appropriate LGBTI+ language and terminology, which was shown to reinforce heteronormalizing practice [14, 15, 21, 29]. Facilitators were also shown to mainly deliver sexual health from a binary perspective (male and female) excluding some LGBTI+ youth. Studies highlighted the need for facilitators to develop an approach to speaking about bodies that utilised gender neutral or re-gendered language [14, 21, 29]. They suggested that this language encompass sexually transmitted infections and pregnancy due to dysphoria experienced by some LGBTI+ youth who do not see their genitals as vagina or penis [21, 29].

There was also a reported ambivalence and anxiety on the part of some facilitators to deliver inclusive sexual health due to their own inherent stigma or perceived inability to address such topics due to lack of information and training [26, 28]. In fact, training and lack of information/resources to help in the delivery of sexual health was the main reason identified by facilitators as to why they felt unable and ill equipped to deliver LGBTI+ inclusive sexual health education [14,17-19, 21, 32].

Positive Attributes

The positive attributes and skills utilised by facilitators that were seen as beneficial to the delivery of sexual health education were also discussed. These included interpersonal skills, listening skills, acceptance, and the ability to provide emotional support [19, 20, 23, 24, 26, 28]. Some facilitators reported applying existing skills such as listening, containment and acceptance when trying to conduct sexual health workshops as this was not provided to them in terms of sexual health training. The tone and manner used to deliver sexual health was also noted as important in how it is received by young people. Facilitators who appeared comfortable with the subject matter and utilised a steady,

confident, and warm tone were regarded as most effective in their delivery of sexual health information [15, 21].

The ability to appear approachable and knowledgeable of same sex relationships was also considered an important attribute, as LGBTI+ youth linked these with the facilitators ability to validate same sex relationships and different gender identities [16, 19, 24-27]. In particular interpersonal skills such as the ability to listen and accept were highlighted as most beneficial as these enabled the facilitator to build capacity in both themselves and young people by demonstrating openness and acceptance of others, and adapting to new information and ways of thinking [14, 18-21, 29, 32].

Differing attributes among facilitators can severely impact on a young person's experience of sexual health education. This variation in experience is highlighted across studies in the need for standardised sexual health policies and curriculums [15, 20-24, 27, 32]. Those tasked with the delivery of sexual health education programmes require training and upskilling of their knowledge on sex, sexuality and LGBTI+ specific sexual health information, and training to promote better interpersonal and listening skills [14, 15, 17, 19-21, 23, 27]. This would enable facilitators to deliver an inclusive curriculum in a supportive environment that takes account of young people's varying sexual identities, relationships and sexual health needs [14, 15, 17, 21, 22, 25, 27, 32].

4. DISCUSSION

Sexual health is an important aspect of overall health [1]. Therefore, inclusive and comprehensive sexual health information should be accessible to all. This review provided a clear overview of the nature of sexual health education as it exists currently. In the absence of inclusive, standardised sexual health education, both young people and facilitators are turning to online platforms to access information and resources. Sexual health education programmes need to be re-designed for the successful delivery of LGBTI+ inclusive sexual health education and the attributes that can impact facilitator delivery need to be considered and addressed.

These findings add to the growing picture of LGBTI+ youth experiences of sexual health, and the constructed heterosexual culture created by education providers and society at large. The former is characterised by high levels of invisibility and marginalisation prominent in LGBTI+ youth accounts of schooling [16, 17, 23, 24, 26]. This is compounded by inadequate information offered to youths, often associated with staff attitudes/behaviours or insufficient training [14-16, 26]. Throughout this synthesis both youth and facilitators noted the internet as their main source of information about LGBTI+ sexual health and services [14-19, 21, 23, 27-32]. This is complimented by findings of Magee et al, (2011) which suggests that LGBTI+ youth often turn to the internet for relevant sexual health

information [33]. Given the lack of comprehensive, LGBTI+-relevant sexual health information available to these youths, the internet represents a crucial, yet underdeveloped setting to provide this information. These findings highlight the need for the provision of evidence based, inclusive, online resources for youth to safely and securely access accurate sexual health information. This would represent equality of access for all young people enabling them to access inclusive information from any location and at any time of their choosing. Equally online training for facilitators would enable direct and standardised training of all those providing sexual health education, and the ability for updated information to reach those delivering in an effective manner.

The need for sexual health education to extend beyond heterosexual norms was also paramount across the studies included in this synthesis. Facilitators and sexual health education programmes must develop ways of talking about bodies and intimacy that shift attention away from the normative association of particular genders with particular anatomies, to encompass a more diverse approach to understanding gender and embodiment in order to make an inclusive programme for all. This can be seen in the curricula in New Zealand, where gender is not discussed as binary, and gender identities and diversity are explored [34]. The studies examined called for inclusive sexual education, inclusive of information on condoms, relationships, and communication [14-19, 21-25, 27-29, 31]. Previous research has shown this type of education increases healthy sexual behaviour in the general student population [2, 34-44]. It is possible therefore, that similar behaviour changes could be expected for LGBTI+ youth with the introduction of a comparable LGBTI+ inclusive sexual health programme.

The results of this synthesis also demonstrate that facilitators differ in their ability to deliver inclusive sexual health due to a lack of knowledge and personal values/beliefs in relation to sexual diversity [14-19, 23-27, 31, 32]. The main obstruction reported was access to training and resources. This is in keeping with findings from the Netherlands which found that school programmes do not provide supportive and affirming messages, and educators feel ill equipped to address LGBTI+ topics [43]. As far back as 2008, Kirby demonstrated comprehensive sexual health had significant effects on delaying initiation of sex and increasing condom and contraceptive use [41]. As such it is crucial that inclusive, comprehensive sexual health education be available to both students and facilitators and that sexual health curriculums are designed to standardise this for all young people.

Overall, this synthesis demonstrated that sexual health education needs to encompass more than sex, puberty, and pregnancy [14-19, 21-23, 25-28, 31]. This supports previous research findings that all students require applicable, informative sexual health education, and that inclusive information is acceptable to all, unlike heteronormative education [46]. As the virtual world we live in becomes the new norm for teaching and training, it appears clear that sexual health education needs to adapt not

only in terms of content but in terms of delivery. The lack of inclusive sexual health education in school settings can only be addressed if those who are facilitating these programmes are trained and provided with the appropriate resources to do so. In order to do this, the internet appears to be the most obvious platform for both educators and youths to access information. Therefore, online platforms should be utilised by policy makers to train, educate and offer resources for the LGBTI+ community along with those who are responsible for the delivery of this education such as teachers and facilitators.

The findings of this review signal the requirement for sexual health policy and educational bodies to standardise an LGBTI+ inclusive curriculum for young people, ensuring facilitators are provided with adequate training and upskilling to deliver it effectively, and that this training and information is made accessible on a secure, national platform [14-19, 23, 32]. These findings also have implications for practice, whereby the means by which sexual health education training is accessed by professionals will be fully online, removing any disparities between rural and central locations [20, 24, 30]. This will also enable those accessing training to do so at times suitable to their individual schedules and feel confident in their ability to access information at any time for a reliable source as required.

Further research is needed to better understand the ability of online training to address the need for inclusive sexual health education. Such research should examine the types of platforms sexual health information is delivered on, and how these are advertised, in order to reduce equality of access and information for young people and professionals. Research is also required in relation to the ability of online training to address the disparities that result due to negative facilitator attributes. Such research would help to further standardised inclusive sexual health education across school settings, reduce stigma and foster inclusion for LGBTI+ young people in the school environment.

4.1 Strengths and Limitations

This review gives a broad overview of best practice in relation to sexual health education for LGBTI+ youth. A search strategy was conducted using three different search engines to access journals with a varying biomedical, behavioural and socio-cultural focus. A robust method of synthesis was employed examining both qualitative and quantitative approaches. The resulting synthesis can be used to help guide future intervention development.

This review has a number of limitations. The inclusion of Medline as a fourth search engine, may have increased the comprehensiveness of the search. The review includes only published peer-reviewed studies in English and is thus susceptible to publication bias. Including studies of varying quality could yield misleading results. This review excluded grey literature (reports, conference proceedings or dissertations) and was limited to research from 1990 onwards. This review did not account for the use

of or absence of theoretical models within sexual health education programmes and their ability to change behaviours, something that should be considered in future research. In addition, the voices of youth who identify as heterosexual and/or cisgender should also be considered when determining the definition of inclusive sexuality education.

4.2 Conclusions

LGBTI+ youth are currently not experiencing inclusive and comprehensive sexual health education. Poor access to information, training and resources remain the primary reasons this is not being delivered. In order to address this, future interventions would benefit from utilising online approaches that facilitate learning for all. Online training for sexual health education providers would offer unprecedented access to inclusive, comprehensive sexual health information removing any geographical barriers or disparities. The provision of such training online would also enable any updates to information or practice to be directly accessed by those providing sexual health education. This could more comprehensively serve the needs of both the LGBTI+ community and those responsible for providing accurate, comprehensive sexual health education.

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6. CONTRIBUTERS

MOF AND MD designed the review, undertook the review searches, screened for eligibility and assessed the quality of the included studies. MOF, MD and PC completed the data analysis. MOF prepared the draft of the systematic review, edited the draft of systematic review. MD read and approved the final manuscript.

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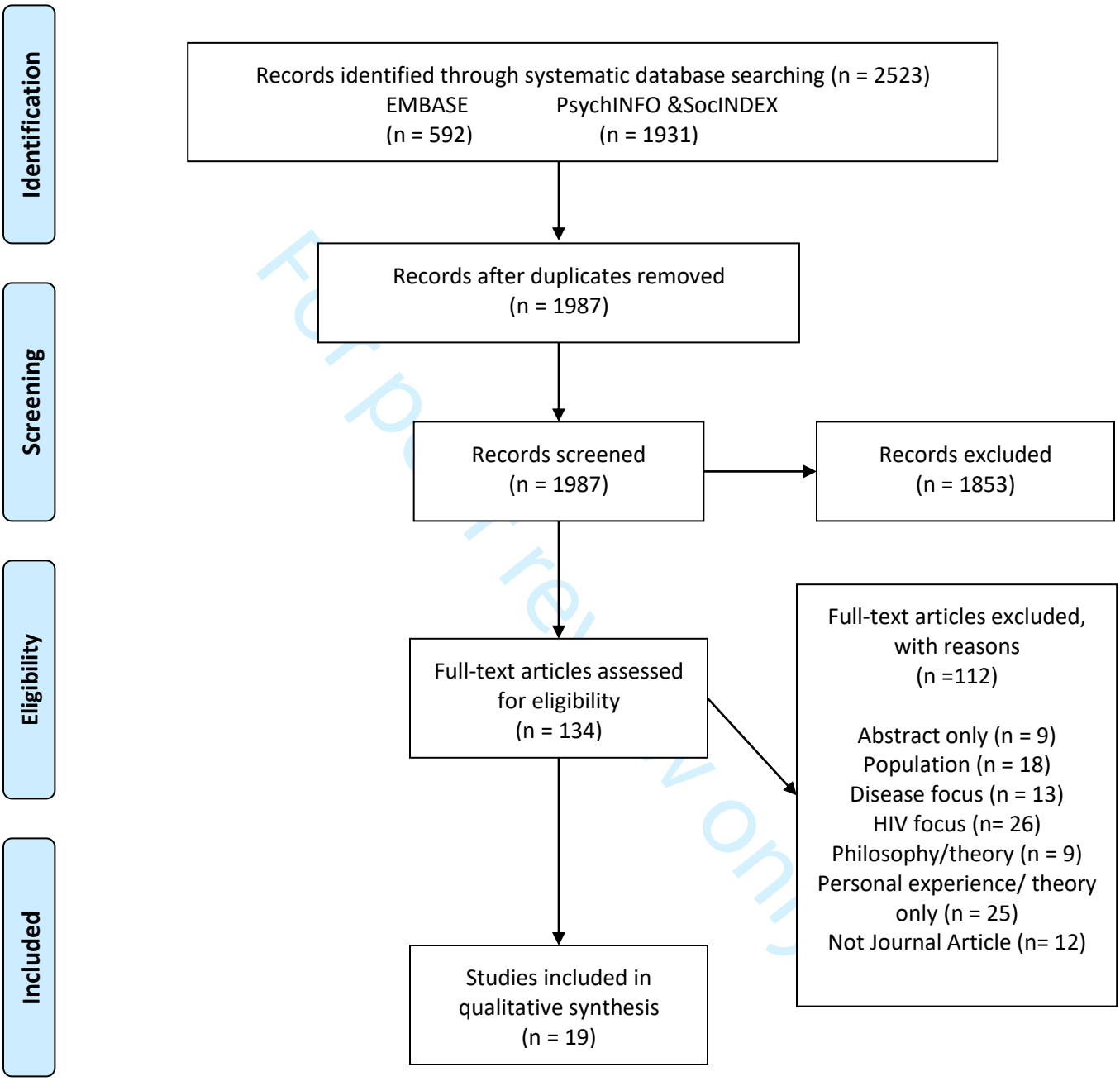
Figure Legend

Figure 1. Identification of studies included in the review
Article selection (PRISMA-P) flow diagram.



Supplemental Data

Search Terms

The same search string was entered into each database. The Search terms for Embase for example were as follows:

Teaching OR learning OR instruction OR Education OR Training OR e-learning OR Platform

AND

LGBTQ inclusive OR Lesbian OR Gay OR Bisexual OR Transgender OR Queer

AND

Sex* OR Sexual Health OR Intimacy

Reporting checklist for systematic review and meta-analysis.

Based on the PRISMA guidelines.

Instructions to authors

Complete this checklist by entering the page numbers from your manuscript where readers will find each of the items listed below.

Your article may not currently address all the items on the checklist. Please modify your text to include the missing information. If you are certain that an item does not apply, please write "n/a" and provide a short explanation.

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		Reporting Item	Page Number
Title			
	#1	Identify the report as a systematic review, meta-analysis, or both.	1
Abstract			
Structured summary	#2	Provide a structured summary including, as applicable: background; objectives; data sources; study eligibility criteria, participants, and interventions; study appraisal and synthesis methods; results; limitations; conclusions and implications of key findings; systematic review registration number	2
Introduction			
Rationale	#3	Describe the rationale for the review in the context of what is already known.	3
Objectives	#4	Provide an explicit statement of questions being addressed with	3

		reference to participants, interventions, comparisons, outcomes, and study design (PICOS).	
Methods			
Protocol and registration	#5	Indicate if a review protocol exists, if and where it can be accessed (e.g., Web address) and, if available, provide registration information including the registration number.	n/a
Eligibility criteria	#6	Specify study characteristics (e.g., PICOS, length of follow-up) and report characteristics (e.g., years considered, language, publication status) used as criteria for eligibility, giving rational	4
Information sources	#7	Describe all information sources in the search (e.g., databases with dates of coverage, contact with study authors to identify additional studies) and date last searched.	4
Search	#8	Present full electronic search strategy for at least one database, including any limits used, such that it could be repeated.	4
Study selection	#9	State the process for selecting studies (i.e., for screening, for determining eligibility, for inclusion in the systematic review, and, if applicable, for inclusion in the meta-analysis).	4
Data collection process	#10	Describe the method of data extraction from reports (e.g., piloted forms, independently by two reviewers) and any processes for obtaining and confirming data from investigators.	12
Data items	#11	List and define all variables for which data were sought (e.g., PICOS, funding sources), and any assumptions and simplifications made.	12
Risk of bias in individual studies	#12	Describe methods used for assessing risk of bias in individual studies (including specification of whether this was done at the study or outcome level, or both), and how this information is to be used in any data synthesis.	12
Summary measures	#13	State the principal summary measures (e.g., risk ratio, difference in means).	6
Planned methods of analyis	#14	Describe the methods of handling data and combining results of studies, if done, including measures of consistency (e.g., I2) for each meta-analysis.	12
Risk of bias	#15	Specify any assessment of risk of bias that may affect the	14

across studies		cumulative evidence (e.g., publication bias, selective reporting within studies).	
Additional analyses	#16	Describe methods of additional analyses (e.g., sensitivity or subgroup analyses, meta-regression), if done, indicating which were pre-specified.	n/a
Results			
Study selection	#17	Give numbers of studies screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally with a flow diagram.	5
Study characteristics	#18	For each study, present characteristics for which data were extracted (e.g., study size, PICOS, follow-up period) and provide the citation.	5
Risk of bias within studies	#19	Present data on risk of bias of each study and, if available, any outcome-level assessment (see Item 12).	5
Results of individual studies	#20	For all outcomes considered (benefits and harms), present, for each study: (a) simple summary data for each intervention group and (b) effect estimates and confidence intervals, ideally with a forest plot.	5
Synthesis of results	#21	Present the main results of the review. If meta-analyses are done, include for each, confidence intervals and measures of consistency.	14
Risk of bias across studies	#22	Present results of any assessment of risk of bias across studies (see Item 15).	5
Additional analysis	#23	Give results of additional analyses, if done (e.g., sensitivity or subgroup analyses, meta-regression [see Item 16]).	n/a
Discussion			
Summary of Evidence	#24	Summarize the main findings, including the strength of evidence for each main outcome; consider their relevance to key groups (e.g., health care providers, users, and policy makers	20
Limitations	#25	Discuss limitations at study and outcome level (e.g., risk of bias), and at review level (e.g., incomplete retrieval of identified research, reporting bias).	22

Conclusions	#26	Provide a general interpretation of the results in the context of other evidence, and implications for future research.	23

Funding

Funding	#27	Describe sources of funding or other support (e.g., supply of data) for the systematic review; role of funders for the systematic review.	23

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Examining LGBTI+ Inclusive Sexual Health Education from the perspective of both youth and facilitators: A Systematic Review

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Title: Examining LGBTI+ Inclusive Sexual Health Education from the perspective of both youth and facilitators: A Systematic Review

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Abstract

Objectives To critically appraise and synthesise the evidence in relation to both the receipt and delivery of LGBTI+ inclusive sexual health education.

Design A systematic review and narrative synthesis.

Data sources A systematic search of three online databases (EMBASE, PsychINFO and SocINDEX) from January 1990 to May 2021 was conducted.

Eligibility criteria Studies included were (1) Peer-reviewed; (2) English; (3) Quantitative, qualitative and mixed methods; that evaluated (4) inclusive sexual health in an educational or online setting; and (5) focused on training or educating. Studies were excluded if (i) the population was not LGBTI+ inclusive; (ii) the studies did not focus on original data; or (iii) the study was not available in full text.

Data extraction and synthesis The studies that met the inclusion criteria were assessed using the Critical Appraisal Skills Programme (CASP) tool. A narrative synthesis was then completed employing content analysis focusing on the results section of each article.

Results Of the 5656 records retrieved, 24 studies met the inclusion criteria. The majority of studies noted that both LGBTI+ youth and those who facilitate sexual health education are turning to online sources of information. Current sexual health education programmes operate mainly from a heterosexual perspective, creating a sense of exclusion for LGBTI+ youth. This is compounded by a lack of training, or provision of an inclusive curricula, resulting in facilitators feeling ill equipped or inhibited by their personal biases.

Conclusions LGBTI+ youth are not experiencing inclusive and comprehensive sexual health education. In parallel, educators report poor access to information, training and resources remain the primary reasons. There is a need to standardise sexual health curricula, making them LGBTI+ inclusive and incorporate holistic aspects of health such as pleasure and healthy relationships. Online approaches should be considered in the future, as they represent equality of access for both sexual health education professionals and LGBTI+ youth alike.

Strengths and limitations of this study

- The search strategy conducted utilised three distinct search engines to access journals with a biomedical, behavioural, and socio-cultural focus.
- A robust method of synthesis was employed examining both qualitative and quantitative approaches of any methodological design addressing LGBTI+ participants or educational training.
- The review includes only published, peer-reviewed studies in English and is thus susceptible to publication bias.
- It excluded grey literature (reports, conference proceedings or dissertations) and was limited to research from 1990 onwards.
- The voices of youth who identify as heterosexual and/or cisgender were not considered when determining the definition of inclusive sexuality education.

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Keywords Systematic review, training, sexual, health, sexual health, inclusive sexual health education, LGBTI+ sexual health, online sexual health.

1. INTRODUCTION

Comprehensive sexual health education has been shown to delay the onset of sexual intercourse, reduce the incidence of human immunodeficiency virus (HIV), and reduce sexually transmitted infection rates among young people [1,2]. However, this has historically been conducted from a heteronormative perspective [3,4]. Studies have shown that early sexual experiences of LGBTI+ youth are different than their heterosexual counterparts. Many frequently disengage as they feel the sexual health information delivered in schools does not directly relate to them [5,6].

Internationally, governments and education policy makers continue to review best practice in the delivery of Relationship and Sexuality Education (RSE) [2,7,8]. Predominantly, the current syllabus focuses less on an individual's sexual health or sexual identity education and more on "relationships education and marriage preparation" [2]. Throughout the past decade, policy makers have considered the introduction of comprehensive, LGBTI+ inclusive RSE education with varying implementation rates worldwide [7]. A recent review highlighted that the inclusion of LGBTI+ faces resistance from parents, religious groups and political groups [7]. In terms of delivery, language, the organisation ethos and the specific facilitator viewpoint and capacity have been highlighted as either enablers or barriers to effective RSE delivery.

Research indicates that when LGBTI+ sexuality is included, it can be regarded as unhelpful by LGBTI+ youth due to a lack of appropriate LGBTI+ terminology and sexual health specific language relating to gender identity [4,5]. Language is not the only barrier in discussing sexuality, same sex practices and desires. Facilitators and educators have reported feeling less confident about discussing LGBTI+ issues due to a lack of resources and training on sexual health [3,5]. As a result, the information provided to LGBTI+ youth varies greatly across educational settings based on the facilitators own values and comfort with the subject [4,6]. For example, where facilitators were embarrassed to make mistakes in relation to discussing gender pronouns or explaining different genders such as non-binary, many chose not to talk about these topics at all [4,6].

There is a need to understand best practice with regard to the delivery of inclusive sexual health education and to develop appropriate training for professionals [4]. Evidence is needed to develop strategies that improve access to inclusive sexual health resources and training. The aim of this review is to critically appraise and synthesise the evidence available in relation LGBTI+ sexual health education for young people aged 16-23 years from the perspective of both the LGBTI+ youth and the professionals who deliver sexual health education in order to understand how best this can be improved.

Definitions

Young People- The term 'young people' for the purpose of this article refers to individuals aged between 16 years to 23 years. This age bracket represents the average ages for teenagers attending second and 3rd level education, also referred to as high school and college level education, who would be in receipt of sexual health education that covers sexual identity and sexual intercourse.

Facilitators- The term 'facilitator' is used for the purpose of this article to refer to those delivering sexual health education. This encompasses teachers, educators, trainers and any form of professional who delivers sexual health education.

2. METHODS

2.1 Search Strategy

A comprehensive literature search was conducted utilising the databases EMBASE, PsychINFO and SocINDEX. These databases were systematically searched for literature published between January 1990 and May 2021. This ensured a wide range of results, representative of international best practice. Each database was fully searched by MOF and MD using predefined search terms. Any discrepancy in included studies was discussed in line with the pre-defined inclusion criteria with a third author (PC).

2.2 Study Eligibility and Selection

Articles published in English between 1990 and 2019 were included in the review if they were (i) peer reviewed journal articles; (ii) related to inclusive sexual health in an educational or online setting; (iii) focused on training or educating. English language content was chosen to ease assessment by a native English-speaking researcher. Peer-reviewed content was employed to identify international best practice regarding sexual health training methods and educational approaches. Both quantitative and qualitative studies were included to ensure a robust representation. Publications beginning from 1990 were chosen as this tracked sexual health development following the 1988 finding that Irish Law prohibiting homosexual activities were in breach of The European Convention on Human Rights [9].

Articles were excluded from the review if: (i) the population was not LGBTI+ inclusive; (ii) studies were based in philosophy or theory and/or (iii) the study was not available in full text (due to institution library subscriptions). Abstracts of included Studies were initially abstract reviewed in line with the above criteria and articles which did not meet these criteria were deemed ineligible following inspection. The final step involved reading the full text of each article in order to identify the final group of studies to be included. A PRISMA flow diagram presents the results in Figure.1.

2.3 Quality Appraisal

In total, 24 papers were critically appraised to ascertain the alignment of the research aim and methodology, and to evaluate the recruitment, settings, data analysis, ethical issues, findings, and contribution to knowledge. The individual studies were assessed for quality using the Critical Appraisal Skills Programme (CASP) tool [10] (See Table 1).

Table 1 Summary of studies included in the review

Source	CASP Score out of 10	Country Where Study Undertaken	Population and setting	Method/ data gathering	Aims/ Objectives	Key Findings
Glikman & Elkayam, (2019)	8	Israel	Students enrolled in various departments of a teacher-education college (n=264) Participants' mean age was 31.6years	Quantitative Used Surveys-Questionnaire	To understand the beliefs of college students on the importance of discussing the issue of sexual orientation with pupils, and in different educational settings.	-School counsellors were considered to be the most appropriate figure to discuss sexual orientation with students -Having witnessed homophobic behaviour enhanced the importance of education around this topic -Education students are not well informed on the subject of sexual orientation, either in terms of general knowledge or the tools available to them
Donovana & Hester, (2008)	7	United Kingdom	Four focus groups with lesbians, gay men, heterosexual women and men; and 67 interviews with heterosexual women and men, and those with experience of same-sex relationships regardless of how they defined their sexuality.	Multimethod research project Nationwide Survey-followed by Focus groups and Interviews	To compare love and violence in heterosexual and same-sex relationships.	-There are a limited number of places where young people can learn about relationships -Young people thinking about exploring alternate sexualities require inclusion in sex and relationship education -Need to focus on ideas, beliefs and expectations of love, care, equality, power, and

						intimacy regardless of gender and sexuality
Mustanski et al., (2014)	5.5	USA (online)	LGBTQI+ Youth aged 16-20 (n= 202)	Mixed methods Pre-test survey Intervention 2 weeks later- Post-test survey	To assess the feasibility, acceptability, and initial efficacy of an innovative online sexual health promotion program tailored for LGBTI+ youth.	-Participants reported learning more in this online programme then in school-based sex education -Most improved areas of learning reported were in relation to sexual functioning, HIV and STIs, and contraceptives
Buston &Hart, (2001)	7	Scotland	25 schools (non-denominational) co-educational state schools 60 lessons, teachers (n= 173), Pupils (n=7630)	Multi method evaluative study SHARE programme delivered over 3-year period (intervention) Or Sex Education "as usual" (control)	To establish if a specifically designed teacher led Sex Ed programme would reduce sexual risk taking.	-Heterosexism in school sex education does exist -Teachers report not having the language to discuss inclusive sex and sexuality education - Constraining factors to including LGBT in sex education identified at both school and societal level -Teachers own values prevent them from delivering non-heterosexist sex education
Rhodes, (2004)	6	United States (online)	Male chat room users (n=619) Web address and chat room name not published to protect participant identity	Mixed method Intervention 6 hours per day in chat group Chat transcripts analysed and coded for themes Demographic data analysed using SPSS	To explore an online intervention to reduce sexual risk in a chatroom frequented by men who have sex with men (MSM).	-Many men expressed interest in sexual risk reduction information -Chatters comfortable asking questions due to anonymity of online chatroom -Health educator was able to provide information on testing locations -Information sought from chatters in relation to: Coming out, youth resources,

						STI screening and condom use.
Hillier & Mitchell, (2008)	9	Australia	Same-sex-attracted youth (n=1749) 14–21 years old	A self-complete survey either online or in printed format Analysed Quantitative using SPSS Qualitative was coded in Excel	To examine whether same-sex-attracted young people are being exposed to appropriate and relevant sex education at school, and if they are not whether it is necessary that sex education be inclusive of sexual difference.	-Many of these youth were sexually active at an earlier age than their heterosexual peers -They were five times more likely to report having been diagnosed with an STI than their heterosexual peers -Accurate knowledge about STIs and pregnancy is needed
Gowen & Winges-Yanez, (2013)	9	Oregon, United States	LGBTQI+ participants (n=30) in two LGBTI youth organisations in Oregon	5 Semi-structured focus groups Digitally recorded and transcribed for analysis and coded into themes	To examine perspectives of LGBTI+Q youth on their experiences with school-based sexuality education in order to create a framework of LGBTI+Q-inclusive sexuality education.	-Current sexuality education is very exclusive of LGBTQ youth -Participants wish to experience discussions regarding gender and sexual orientation in order to feel directly acknowledged -No part of the existing curriculum was suggested for subtraction, only some additions and reframing of current materials was proposed
Baams et al., (2017)	7	Utrecht, Netherlands	Dutch adolescents (n=601) from 6 different high schools in grades 10-12 Representing urban, suburban, and rural areas	3 wave longitudinal research project The first wave was conducted in Fall 2014, followed by two subsequent measurements after 4 and 8 months This study focuses on the first and third measurement waves.	To examine whether the content or extensiveness of sexuality education at the beginning of the school year is related to a decrease in LGBTI+Q name-calling and an increase in the willingness to intervene when witnessing LGBTI+Q name-calling at the end of the school year.	-Sexual orientation and gender are rarely covered in sexuality education -There is a need to cover resources and how to access services in sexuality education - Teachers are believed to feel inadequate to teach about sexual diversity

MacMaster et al., (2003)	4	California, United States	Asian and Pacific Islander MSM in Santa Clara County, California. Number of participants and demographic data was not provided	Qualitative chat room discussions	To test the impact of an Internet based outreach to "high risk" MSM living in Santa Clara County.	-Successfully demonstrated the feasibility and impact of an internet-based programme to reach often over-looked at risk populations -Programme resulted in 46 referrals for HIV testing
Formby, (2011)	9	England, United Kingdom	Findings from 3 small studies drawn together LGBTI+ youth (n=375) aged 13-23 years	Qualitative Self-completion surveys and/or in-depth interviews/focus groups	To examine influences on sexual activity, conceptualizations/ understandings of sexual health and 'safe sex', and expectations in relation to safer sex.	-Young people would like discussion and information on same sex relationships in SRE -Ways to improve provision include well informed external speakers -Alcohol and drug use was a factor in sexual decision making -There is a need for appropriate sexual health information, and access to safer-sex supplies -Internet key to accessing sexual health information
Lindroth et al., (2017)	8	Sweden	Descriptive statistics from web-based survey (n=796) and qualitative interview study with transgender people (n=20) Total n=816	Mixed Methods Descriptive statistics from a previous web-based survey and previous qualitative interview study with transgender people were combined.	To explore and describe holistic sexual health and sexual health determinants among transgender people in Sweden.	-Not being able to fully live sexually as one wishes, and being dissatisfied with one's sex life have implications for everyday life -Access to gender confirming operations is described as a vital component for sexual health -Feelings of anxiety, uncertainty or fear in sexual situations hinders sexual health -More than one third reported not

						knowing where one can be treated with respect while getting tested for HIV and other STIs.
Sherlock, (2012)	5	Sweden and Ireland	Sexuality education professionals in Ireland (n= 17) and Sweden (n=17)	Qualitative Interviews	To examine the Socio-political influences on sexuality education in Sweden and Ireland.	-Both countries complain of sparse teacher training, curriculum updates and programme reviews -More research, discussions and engagements with sexuality education issues are needed in Ireland and Sweden -Policy barriers (religious) and gaps in curricular implementation require urgent attention and funding in both countries
DeHaan et al., (2013)	8	United States (online)	LGBTI+ youth (n=32) Ages 16–24	60-90-minute semi structured Interviews Transcribed into EthnoNotes a mixed method analysis program	To investigate the interplay between online and offline explorations of multiple dimensions of sexual health, which include sexually transmitted infections, sexual identities, romantic relationships, and sexual behaviour.	-LGBT population more likely to turn to the internet for information and connection -Internet is the main source of information -Youth actively searched online for offline services such as testing, Doctors and LGBT sensitive services -Youths open to receiving information online
Hobaica & Kwon, (2017)	8	Washington, United States	N=12 people from sexual minorities (SM) Sexual minorities included: lesbian, gay, bisexual, queer, pansexual, demisexual, and asexual	Qualitative study, 40-90 minute semi-structured interviews	To explore sexual minorities experiences of sexual health education.	Heteronormative sex education may contribute to poor physical health outcomes for SMs. -Participants reported that inclusive sex education would concurrently benefit heterosexual students -Inclusive curricula would increase

						self-esteem and confidence for SM students -Importance of incorporating role models of various identities into curriculums to reduce negative stigma
Riggs & Bartholomaeus, (2018)	9	Adelaide, Australia	Seven videos by transgender young people (n=5) aged 18-25	Analyse discussions of intimacy from the perspectives of transgender young people as narrated in a sample of YouTube videos	To examine what transgender young people would like to see covered in sexuality education.	-Sex education needs to address sexuality and gender, extending beyond heterosexual norms -As potential friends, classmates and intimate partners of their transgender peers, cisgender students should be educated in an inclusive manner -Educators and sex education programmes must develop ways of talking about bodies and intimacy with a more diverse approach to understanding gender and embodiment.
Abbott et al., (2015)	8	United Kingdom	8 semi-structured interviews with Relationship and Sexuality Education (RSE) teachers (n=2)	Qualitative discursive psychological approach used to analyse interview data	An Analysis of How Teachers Uphold Heteronormative Sex and Relationship Education	-Teachers reported those who engage in same sex relationships as isolated -Teachers require regular updating of their knowledge around sex, sexuality and issues affecting young people -Teachers need to be made aware of ways in which they can promote inclusivity
Hoefer & Hoefer, (2017)	7	Texas, United States	N=16 students at a southwestern University who identified as one or	Qualitative	To examine the impact of	-Particularly prevalent were messages in this education about

			more of the following: female, LGBT, or person of colour	recorded in-person interviews	abstinence-only sex education curricula	women, LGBTQ and sex as shameful and scary -These messages left long lasting impacts on the way participants felt about themselves, their peers, and sexuality. -Refusal to discuss LGBTQ issues allowed students to move into adulthood feeling confused and guilty
Halyey et al., (2019)	9	Seattle, United States	Transgender and nonbinary (TNB) youth (n= 11), parents (n=5) and healthcare affiliates (n=5) from Seattle Children's gender clinic	Qualitative In-depth interviews analysed using thematic analysis	To use insights of TNB youth, parents of TNB youth and healthcare affiliates to understand deficits in sex education experienced by TNB youth.	-TNB youth have unique sex education needs that are not commonly covered in standard sex education -Inadequate information leads TNB youth to seek information from potentially inaccurate, unfiltered sources -Negative outcomes had been experienced by many participants including STIs, pregnancy, unsafe binding, unsanitary sex toy use, and shame about their bodies and sexual desires Sex education needs to be inclusive and may need reframing to be trans-inclusive
Cahill et al., (2019)	9	United States	Youth Serving Professionals including: Adolescent health providers, school nurses, youth workers, and school educators (n=34)	Qualitative study	To explore barriers and facilitators that professionals face in delivering HIV preventive services and education.	-Educational materials should be free, disseminated in a variety of formats (online and downloadable), and evidence based -Tools should be specifically designed for youth and should involve

						peer education and use popular technologies -Training programme needs to include basics about sexual orientation, gender identity, and approaches for HIV risk reduction to enable the provision of affirming services
Pampati et al, 2021	9	International	Sexual and Gender Minority Youth [with a mean age of between 10 and 24 years]	Systematic Review	To synthesize the diverse body of literature on sexual and gender minority youth (SGMY) and sexual health education.	- A synthesis of the characteristics of inclusive sexual health education are detailed - Interventions in sexual health education covered a wide range of topics including HIV, STI's, risk reduction approaches, prosocial skills. - Content should be delivered via relatable individuals is crucial in terms of programme delivery.
Andrzejewski et al, 2020	8	United States	Websites with Sexual and reproductive health content for adolescents and young adults	Systematic Google Search	To characterise the strengths and weaknesses of sexual and gender minority related messages from websites that address sexual and reproductive health for young people.	- Websites regularly use aggregate terms to define the sexual health needs of all minority populations of constructs - Websites and messages sometimes conflate the constructs of sexual orientation and gender identity Few websites discuss topics of particular relevance to sexual and gender minority youth such as PrEP and PEP however the majority include

						information on pregnancy.
Carey, 2019	6	United States	Adolescent males interested in sex with males aged 14-17, cisgender, self-identify as gay, bisexual or are sexually attracted to males, reside in the US and had an e-mail address	Quantitative Study	To determine where adolescent males interested in sex with males receive sexual health information, clarify their preferences and explore relations with sexual behaviour	- Adolescents regularly (>66%) used websites for information regarding sex - Group required information on having safe and comfortable anal sex, types of sex, condoms, lubrication - Sexual health information should include visual representation, communication techniques, types of sexual behaviours and the influence of pornography
Formby & Donovan, 2020	9	England	Young people aged 14-25 years who identified as a gender or sexual minority	Qualitative study	To examiner what LGBT inclusive sex and relationships education should address in practice	- Young people reported varied experiences of sex and relationship education and the settings which they received the education were sometimes perceived as inherently homophobic - Pornography was sometimes used as a form of sex education by LGBT young people - Peer education was seen as a potentially useful resource when considering sex and relationship education
Narushima et al, 2020	8	Canada	Young people involved in the Youth Engagement Project in Canada	Qualitative study	To explore the perspectives and experiences of youth to identify the key elements of innovation, strength-focused and youth driven sexual health education that will	- Young people noted the importance of finding the LGBT community to gain acceptance - Sex education was noted as too

					reduce sexual health disparities among marginalised youth	biology based and heteronormative - Sex education needed to include sexual orientation, gender identity and relationships Support and discussion for parents and teachers is important to facilitate better education and support for young people

2.4 Data Synthesis

The papers comprised qualitative and quantitative study designs. There was a large degree of heterogeneity between included studies, a number of which were single pre-post test in design. It is not appropriate to conduct meta-analysis on studies that are at risk of bias or are too diverse, as the results can be misleading [11]. As such a narrative synthesis technique was employed, utilising the Popay et al. (2006) framework [12]. Narrative synthesis uses words and text to summarise and explore data from both quantitative and qualitative studies. Recommendations were followed about using specified search methods and organising the output as a synthesis, to 'tell a story.' The results sections of each paper were analysed by all three authors to identify evidence of the impact of sexual health education in a variety of contexts. First, a preliminary synthesis was developed. The same relevant data were extracted from all papers and tabulated. A content analysis with an inductive approach was then conducted which allows themes to emerge from the data (See Table 2). Two co-authors (MOF and MPD) proposed and defined categories following analysis. Any discrepancies were discussed with a third author (PC).

Table 2. Study Content Analysis

Content		**Study Reference Numbers**																							
Category	Themes in Data	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37
Online Learning	Students and facilitators seeking information online	√	√	√	√	√	√	√	√			√	√		√	√	√	√	√	√	√	√	√	√	√

	Need to utilise popular technologies e.g. YouTube		√													√						√		
	Web based/ Free online resources		√		√			√			√		√			√						√	√		√
	Internet acts as educator/ facilitator/ information source				√	√	√	√			√		√			√	√	√		√		√			√
	Equity of Access			√			√		√									√			√		√		
	Anonymity Online for users								√							√		√			√		√		
	Unaware where to access reliable info online		√		√	√										√	√	√							
Sexual Health Programme Components	Include different genders and sexual orientations	√	√	√	√	√		√	√	√			√	√	√	√	√		√	√	√	√			√
	Intimacy and Relationships	√		√					√			√	√	√					√	√				√	√
	Contraception and STIs		√	√	√	√						√	√	√		√				√	√	√		√	√
	Inclusive and supportive- Not heteronormative	√	√	√	√	√			√	√		√	√	√	√	√	√		√	√	√	√		√	√
	Physical and emotional health		√	√								√	√	√						√				√	√
	Students 'see themselves in curriculum'	√			√	√			√	√		√	√		√						√	√			
	Terminology and language important	√			√			√								√	√		√	√				√	
	Signposting to support services	√		√	√				√					√					√		√	√		√	
Facilitator Attributes	Facilitator characteristics e.g. Interpersonal Skills, listening skills	√		√			√			√					√			√	√				√	√	
	Personal bias/ core values			√	√			√		√	√			√				√			√				
	Comfort and ability to address issues of gender and sexuality			√	√		√			√	√			√	√				√				√	√	

	Feel unable/ not confident				√			√			√			√	√						√				
	Knowledge of sexual health information	√	√				√			√					√			√		√		√	√	√	
	Tone and delivery important	√		√				√	√	√					√				√						

In order to establish trustworthiness in the analysis, well-grounded methods, including thick description of the findings and maintaining a detailed audit trail were utilised by all three researchers. The narratives were read once before coding began for the researchers to familiarise themselves with the data. The researchers then coded the results section of each paper before these codes were grouped and summarised. These codes were then compared across authors and the relationship between codes were considered, in some cases leading to the amalgamation of separate categories under a superordinate group. Note that counting was not routinely applied in analysis, as a count is considered to convey that all codes warrant equal weighting [13].

2.5 Patient and Public Involvement

Patients and the public were not involved or required for the completion of this study. Reviews are exempt from Institutional Review Boards.

2.6 Ethics Approval

Due to the nature of this type of research, ethical approval and review was not required.

3. RESULTS

3.1 Study Descriptions

The final twenty-four studies included twelve qualitative studies [14-25], three quantitative [26-28], seven mixed methods study designs [29-35] and two reviews [36, 37]. Fifteen of these focused on the experiences of LGBTI+ youth in various educational settings [16-18, 21, 23-25, 27-29, 31, 32, 34-37]. One referred to youth of all sexualities including heterosexual [22]. Four examined professional experiences of delivering sexual health education [14, 15, 22, 23]. One examined the impact of abstinence only sexual health education [16], one examined the content of reproductive and sexual health web sites for sexual and gender minority youth [37], and one examined sexual health online interventions in a men who have sex with men (MSM) chatroom [33]. Three main categories were

derived from the content analysis: 1) Online Learning, 2) Inclusive Programme Components, and 3) Facilitator Attributes.

3.2 Online Learning to Facilitate Accessible Equitable Sexual Health Education

The virtual world enables instant access to information at the touch of a button. Educators and youth alike were shown to be turning to online resources to seek out and access information on sexual health. Fifteen studies showed that young people are seeking sexual health information [14-21,24,27,29,30,32,34,35]. Of particular note, was the fact that young people are open to receiving information virtually, are familiar in engaging with online platforms, and are shown to learn effectively through this medium [14, 16-21, 23,28,31-35].

LGBTI+ Youth recognising themselves in the education provided

For LGBTI+ youth online access to information represents equality of access. Online sexual health information was shown to afford LGBTI+ youth control over their sexual health needs, allowing them to self- educate on topics not covered in traditional heterosexual focused sexual health education such as gender identities, sexualities, and surgical and non-surgical interventions for transgender individuals [17]. Specifically, LGBTI+ youth were shown to turn to the internet due to the value they place on their anonymity [17, 18, 20, 21, 30, 34]. This was described as being of significant importance for youth who report not seeking answers in group settings for fear of being inadvertently 'outed' [17, 19, 29].

While many LGBTI+ youth reported viewing the Internet as their main source of information in relation to sexual health, relationships and sexuality (Hillier), they were also shown to actively search online for a diverse range of offline services, including HIV and STI screening, where to purchase contraceptives and LGBTI+ friendly services [14, 16, 17, 20, 21, 27]. The ability to access sexual health information online was shown to result in increased sexual and emotional wellbeing for LGBTI+ youth [35], who report poorer levels of sexual health education and higher levels of dissatisfaction with their sex lives [32,33].

Not only does internet based sexual health education provide accessible and equitable sexual health outcomes for LGBTI+ youth, but seven studies also outlined the benefit of online education as a means of accessing difficult to reach and overlooked populations such as those in rural or remote locations [16, 17, 18, 20, 33, 35]. Another advantage of an online platform was the ability to interact with young people in real time. Where a chatroom-based intervention was offered, this uniquely allowed tailored messages to be provided to meet the specific needs of the young people [33]. Some disadvantages

were also noted such as the ambiguity for LGBTI+ youth on the best source of accurate, information online [30].

Facilitators having the capacity to deliver inclusive, accurate education

Thirteen studies found that facilitators were also seeking information and training tools online due to the lack of LGBTI+ inclusive information, resources, and training in the sexual health curriculums [14-18, 20, 23, 32-35]. They reported a need for web based and downloadable teaching resources, with the suggestion that sexual health websites have links to offline materials and supports [15, 16, 19, 20, 33-35]. There was a lack of awareness on the part of facilitators as to the best sources of information online, with an emphasis placed on the need to be able to download and transfer these resources to the education setting [16, 20, 33, 34]. Akin to LGBTI+ youth, facilitators also highlighted the need for trustworthy resources and online sources of information online, suggesting the need for a one stop website for all sexual health enquiries and training [15, 16, 20, 34].

Online learning as a mode of inclusive learning

The majority (n=13) of the studies concluded that online learning was both possible and highly effective [14, 15, 18-20, 23, 24, 27, 28, 32, 33, 35]. The results demonstrated the feasibility and potential impact of internet learning when consideration is given to a number of factors including internet connection, and that accuracy/bias of the source [17, 34]. In fact, LGBTI+ students in particular were shown to learn more from online than in school (15, 16, 18-20, 24, 27, 33-35].

In order for online learning to be as effective as possible a number of design elements were highlighted across the studies. The visual attractiveness of online platform was noted as important as it was key to engaging users and relaying the information [23]. Nine studies referenced the need for an online site to provide links to offline materials and supports, along with free resources disseminated in a variety of formats such as downloadable [15, 16, 18, 20-23, 26, 35]. Two studies suggested utilising existing sites used by LGBTI+ youth such as YouTube, as a way of offering information online that would reach specified groups, providing them with accessible and equitable access to information [15,25, 35]. However, two studies noted caution surrounding online sexual health education due to the propensity of some to use pornography as a form of education tool [24, 25].

3.3 The Programme Components of Inclusive Sexual Health Education

Overall, LGBTI+ youth reported dissatisfaction with the information included in sexual health education curriculums. The nature of sexual health education reported by participants across studies was predominantly heteronormative [14-22, 29-31, 34].

Current Relationship and Sexual Health Education Components

Current sexual health education focused on vaginal intercourse, pregnancy prevention and marriage. As a result, many LGBTI+ youth reported they felt the course material was not relevant to their lives. Sexual diversity in terms of sexuality, same sex relationships, and identity were not included in the majority of sexual health education topics [14, 16, 22-26, 31, 32, 35] , with restrictions described on topics such as sexual pleasure and what constitutes 'healthy' relationships [32]. Participants across studies described sexual health education as only focusing on the biological standpoint and lacking context [16, 32]. This resulted in LGBTI+ youth feeling vulnerable, unaccepted and 'less than' their heterosexual peers [18, 22, 24, 26].

Current sexual health education was also reported to focus on a medical and/or disease prevention methodology [20, 32]. While the majority of respondents across surveys reported the importance of receiving sufficient information to protect themselves against HIV and STIs [16, 18, 22, 23, 26, 27, 29, 31, 35-37], transgender respondents in particular were unaware of services they could access where they would be treated with respect and understanding while getting an STI screening [16, 23, 32]. Four studies found that young people were not given basic information about their bodies, reproduction or contraceptives [17, 19, 23, 32]; with some being advised to use condoms without ever being shown how [19, 32].

A common theme across studies related to LGBTI+ invisibility, marginalisation, or exclusion [14, 16, 20, 22, 23, 30, 33, 34]. Where LGBTI+ youth sought to be informed on relevant issues, they were reportedly met with what they described as 'homophobia', whereby facilitators failed to signpost LGBTI+ youth to relevant services or community groups [14, 16, 20, 22, 23, 24, 30-34]. As such many LGBTI+ youth described feeling isolated and ashamed of their sexuality and unaware of where to seek support and often reduced their engagement in any sexual health education [17, 20, 23, 28, 30, 32, 34].

The assumption that all youth are heterosexual immediately separates the information as not personally relevant for many same-sex attracted young people, resulting in their disengagement [16, 23, 29, 28]. Three of the studies found that LGBTI+ young people were unable to transfer the information they needed from classes on safe heterosexual sex to their own practice [16, 23, 29].

Notably, this was not the case in reverse, whereby heterosexual youth remained engaged when sexual health information was delivered in an inclusive format [19, 23, 26]. In fact, the inclusion of LGBTI+ topics in sexual health education was shown to reduce stigma, foster self-esteem and limit negative mental health outcomes for LGBTI+ youth [14, 16, 17, 23, 34].

Components required for Inclusivity

The programme components required for inclusive sexual health education were discussed across studies. Sixteen studies found that sexual health education needs to encompass more than sex, puberty and pregnancy information [14-20, 23, 26, 27, 29-34]. Topics identified for inclusion into LGBTI+ inclusive sexual health included same sex relationships, LGBTI+ terminology, aspects of LGBTI+ questioning and signposting to services [14, 16-20, 25-29, 30, 36]. There is also a need to provide information regarding sexual orientation, gender identity and approaches for STIs [15, 19, 20, 25, 29, 30, 34, 36, 37], barrier protection methods [16, 18, 21- 23, 28, 31] and HIV risk reduction [16, 21, 22, 33, 36] . Twelve studies proposed that not only physical but emotional aspects of sexual health need to be discussed with young people to provide a holistic approach to sexual health education [14-18, 21-23, 25, 26, 29, 32, 34, 36, 37] . This would include discussing relationships, love and communication and creating awareness around feelings of anxiety and uncertainty [14-19, 23, 25, 28, 34, 36, 37]. In order to promote inclusivity, the use of resources representing sexual diversity in the classroom was considered paramount [14, 17-20, 22, 23, 26, 27, 29-34, 36].

Four studies indicated that youth who experienced education on respectful intimate relations were validated in who they were and reported an overall positive effect on their sexual health experiences [16, 19, 23, 31]. LGBTI+ young people were shown to have increased wellbeing as a result of seeing themselves in the curriculum [18, 22, 32,36]. Some studies identified the need to distance the discussion of relationships from gender and heterosexuality, and instead focus on beliefs, expectations of love, care equality and intimacy, regardless of gender [15, 17-19,23, 31]. In addition, six studies found that transgender youth needed more in-depth information around gender affirming interventions both medical and non-medical e.g. binding and 'bottom surgery' (this is a form of gender affirmation surgery) [14, 23, 30, 32, 34].

Thirteen studies reported that the tools employed for inclusive sexual health education should involve peer education, resources with youth representation, and popular technologies [14-18, 20, 23-25, 33-35] . To improve the provision of services, fifteen studies pointed to the need for well-informed external speakers or educational resources [15-19, 21-23, 26,29-33, 35]. These studies also addressed the need for education materials to be evidence based, free, and disseminated in a variety of formats,

including online [16, 22, 31, 32-34, 35]. Six studies elucidated the importance of taking account of learning styles and promoted learning in different ways such as role playing, discussion, and watching videos [16, 20-23, 26]. Three studies addressed the need to discuss what Is perceived as important by youths in smaller groups [16, 20, 21]. These also highlighted the benefit of mixed groups where applicable to allow for the integration of all genders and sexualities [16, 20, 21].

In order to build capacity, the need for practical demonstrations and communication around condoms to reduce risky decision making was considered of particular importance [14, 16, 17, 19, 23, 31, 32, 34]. Approaches across eight studies identified common multidisciplinary needs and identified ways to equip professionals to deliver effective sexual health education [14, 16, 17, 21, 23, 31, 34, 35]. In particular, they noted the need for the implementation of policies to reduce sexual health disparities, and the introduction of a standardised curriculum whereby professionals are equipped with appropriate knowledge relating to sexual health [17, 21-23, 31, 34].

3.4 Defining the Facilitator Attributes necessary for Inclusive Learning

Personal values, comfort levels and access to information and training can impact on facilitator ability to deliver inclusive sexual health education. In a school context, educators were reported as crucial in creating an inclusive environment and in setting the tone for the way discussions are held [14, 15, 19, 21-23, 26, 27,36] . Current facilitators often complained of sparse teacher training, and lack of curriculum updates for their poor knowledge and comfort levels in relation to delivering comprehensive sexual health education [15-23, 26, 27, 30], with this argument used by some to justify a need for external facilitators [17, 21, 27].

Attributes which act as a barrier to learning

A large percentage of studies found facilitators were ill equipped to talk about sexual health with young people due to their own discomfort with the subject matter combined with a lack of training [14, 17, 21, 22, 27, 29, 30, 32]. Particular attributes were identified as being unhelpful in the delivery of inclusive sexual health information. These included a lack of appropriate LGBTI+ language and terminology, which was shown to reinforce heteronormalizing practice [14, 15, 21, 32]. Facilitators were also shown to mainly deliver sexual health from a binary perspective (male and female) excluding some LGBTI+ youth including non-binary and intersex communities. Studies highlighted the need for facilitators to develop an approach to speaking about bodies that utilised gender neutral or re-gendered language [14, 21, 32]. They suggested that this language encompass sexually transmitted infections and pregnancy due to dysphoria experienced by some LGBTI+ youth who do not see their genitals as vagina or penis [21, 32].

There was also a reported ambivalence and anxiety on the part of some facilitators to deliver inclusive sexual health due to their own inherent stigma or perceived inability to address such topics due to lack of information and training [29, 31]. In fact, training and lack of information/resources to help in the delivery of sexual health was the main reason identified by facilitators as to why they felt unable and ill equipped to deliver LGBTI+ inclusive sexual health education [14,17-19, 21, 35].

Enabling attributes of youth education in sexual health

The positive attributes and skills utilised by facilitators that were seen as beneficial to the delivery of sexual health education were also discussed. These included interpersonal skills, listening skills, acceptance, and the ability to provide emotional support [19, 20, 23, 26, 29, 31]. Some facilitators reported applying existing skills such as listening, containment and acceptance when trying to conduct sexual health workshops as this was not provided to them in terms of sexual health training. The tone and manner used to deliver sexual health was also noted as important in how it is received by young people. Facilitators who appeared comfortable with the subject matter and utilised a steady, confident, and warm tone were regarded as most effective in their delivery of sexual health information [15, 21].

The ability to appear approachable and knowledgeable of same sex relationships was also considered an important attribute, as LGBTI+ youth linked these with the facilitators ability to validate same sex relationships and different gender identities [16, 19, 26, 27, 29, 30]. In particular interpersonal skills such as the ability to listen and accept were highlighted as most beneficial as these enabled the facilitator to build capacity in both themselves and young people by demonstrating openness and acceptance of others, and adapting to new information and ways of thinking [14, 18-21, 32, 35].

Differing attributes among facilitators can severely impact on a young person's experience of sexual health education. This variation in experience is highlighted across studies in the need for standardised sexual health policies and curriculums [15, 20-23, 26, 30, 35]. Those tasked with the delivery of sexual health education programmes require training and upskilling of their knowledge on sex, sexuality and LGBTI+ specific sexual health information, and training to promote better interpersonal and listening skills [14, 15, 17, 19-21, 23, 30]. This would enable facilitators to deliver an inclusive curriculum in a supportive environment that takes account of young people's varying sexual identities, relationships and sexual health needs [14, 15, 17, 21, 22, 27, 30, 35].

4. DISCUSSION

Sexual health is an important aspect of overall health [38]. Therefore, inclusive and comprehensive sexual health information should be accessible to all. This review provided a clear overview of the nature of sexual health education as it exists currently. In the absence of inclusive, standardised sexual health education, both young people and facilitators are turning to online platforms to access information and resources. Sexual health education programmes need to be re-designed for the successful delivery of LGBTI+ inclusive sexual health education and the attributes that can impact facilitator delivery need to be considered and addressed.

These findings add to the growing picture of LGBTI+ youth experiences of sexual health, and the constructed heterosexual culture created by education providers and society at large. The former is characterised by high levels of invisibility and marginalisation prominent in LGBTI+ youth accounts of schooling [16, 17, 23, 26, 29]. Previous research notes how "sex education is one very effective way in which the heteronormative status quo is maintained" [39]. Sex education has remained stagnant throughout the past number of decades despite liberation of many peripheral areas. This has led "to criticism of inclusivity, morals, and ethics and other criticism; however, it has yet to become all-inclusive, comprehensive, and effective" [39]. This is compounded by inadequate information offered to youths, often associated with staff attitudes/behaviours or insufficient training [14-16, 29]. Throughout this synthesis both youth and facilitators noted the internet as their main source of information about LGBTI+ sexual health and services [14-19, 21, 23, 30-35]. This is complimented by findings of Magee et al, (2011) which suggests that LGBTI+ youth often turn to the internet for relevant sexual health information [40]. Given the lack of comprehensive, LGBTI+-relevant sexual health information available to these youths, the internet represents a crucial, yet underdeveloped setting to provide this information. These findings highlight the need for the provision of evidence based, inclusive, online resources for youth to safely and securely access accurate sexual health information. This would represent equality of access for all young people enabling them to access inclusive information from any location and at any time of their choosing. Equally online training for facilitators would enable direct and standardised training of all those providing sexual health education, and the ability for updated information to reach those delivering in an effective manner.

The need for sexual health education to extend beyond heterosexual norms was also paramount across the studies included in this synthesis. Facilitators and sexual health education programmes must develop ways of talking about bodies and intimacy that shift attention away from the normative association of particular genders with particular anatomies, to encompass a more diverse approach to understanding gender and embodiment in order to make an inclusive programme for all. This can

be seen in the curricula in New Zealand, where gender is not discussed as binary, and gender identities and diversity are explored [41]. The studies examined called for inclusive sexual education, inclusive of information on condoms, relationships, and communication [14-19, 21-23, 26, 27, 30-32, 34]. In addition, previous research highlights that the inclusion of LGBTI+ issues has positive effects on all sexualities [7]. Previous research has shown this type of education increases healthy sexual behaviour in the general student population [2, 41-51]. It is possible therefore, that similar behaviour changes could be expected for LGBTI+ youth with the introduction of a comparable LGBTI+ inclusive sexual health programme.

The results of this synthesis also demonstrate that facilitators differ in their ability to deliver inclusive sexual health due to a lack of knowledge and personal values/beliefs in relation to sexual diversity [14-19, 23, 26, 27, 29, 30, 34, 35]. The main obstruction reported was access to training and resources. This is in keeping with findings from the Netherlands which found that school programmes do not provide supportive and affirming messages, and educators feel ill equipped to address LGBTI+ topics [50]. As far back as 2008, Kirby demonstrated comprehensive sexual health had significant effects on delaying initiation of sex and increasing condom and contraceptive use [48]. As such it is crucial that inclusive, comprehensive sexual health education be available to both students and facilitators and that sexual health curriculums are designed to standardise this for all young people.

Overall, this synthesis demonstrated that sexual health education needs to encompass more than sex, puberty, and pregnancy [14-19, 21-23, 27, 29-31, 34]. This supports previous research findings that all students require applicable, informative sexual health education, and that inclusive information is acceptable to all, unlike heteronormative education [52]. As the virtual world we live in becomes the new norm for teaching and training, it appears clear that sexual health education needs to adapt not only in terms of content but in terms of delivery. The lack of inclusive sexual health education in school settings can only be addressed if those who are facilitating these programmes are trained and provided with the appropriate resources to do so. In order to do this, the internet appears to be the most obvious platform for both educators and youths to access information. Therefore, online platforms should be utilised by policy makers to train, educate and offer resources for the LGBTI+ community along with those who are responsible for the delivery of this education such as teachers and facilitators.

The findings of this review signal the requirement for sexual health policy and educational bodies to standardise an LGBTI+ inclusive curriculum for young people, ensuring facilitators are provided with adequate training and upskilling to deliver it effectively, and that this training and information is made accessible on a secure, national platform [14-19, 23, 35]. These findings also have implications for

practice, whereby the means by which sexual health education training is accessed by professionals will be fully online, removing any disparities between rural and central locations [20, 26, 33]. This will also enable those accessing training to do so at times suitable to their individual schedules and feel confident in their ability to access information at any time for a reliable source as required.

Further research is needed to better understand the ability of online training to address the need for inclusive sexual health education. Such research should examine the types of platforms sexual health information is delivered on, and how these are advertised, in order to reduce equality of access and information for young people and professionals. Research is also required in relation to the ability of online training to address the disparities that result due to negative facilitator attributes. Such research would help to further standardised inclusive sexual health education across school settings, reduce stigma and foster inclusion for LGBTI+ young people in the school environment.

4.1 Strengths and Limitations

This review gives a broad overview of best practice in relation to sexual health education for LGBTI+ youth. A search strategy was conducted using three different search engines to access journals with a varying biomedical, behavioural and socio-cultural focus. A robust method of synthesis was employed examining both qualitative and quantitative approaches. The resulting synthesis can be used to help guide future intervention development.

This review has a number of limitations. The inclusion of Medline as a fourth search engine, may have increased the comprehensiveness of the search. The review includes only published peer-reviewed studies in English and is thus susceptible to publication bias. Including studies of varying quality could yield misleading results. In terms of the included studies a number of limitations were noted. The majority did not discuss the relationship between the researcher and the participants. In addition, pre-defined sample size calculations were not reported in all studies. This review excluded grey literature (reports, conference proceedings or dissertations) and was limited to research from 1990 onwards. This review did not account for the use of or absence of theoretical models within sexual health education programmes and their ability to change behaviours, something that should be considered in future research. In addition, the voices of youth who identify as heterosexual and/or cisgender should also be considered when determining the definition of inclusive sexuality education.

4.2 Conclusions

LGBTI+ youth are currently not experiencing inclusive and comprehensive sexual health education. Poor access to information, training and resources remain the primary reasons this is not being delivered. In order to address this, future interventions would benefit from utilising online approaches

that facilitate learning for all. Online training for sexual health education providers would offer unprecedented access to inclusive, comprehensive sexual health information removing any geographical barriers or disparities. The provision of such training online would also enable any updates to information or practice to be directly accessed by those providing sexual health education. This could more comprehensively serve the needs of both the LGBTI+ community and those responsible for providing accurate, comprehensive sexual health education.

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6. CONTRIBUTERS

MOF AND MD designed the review, undertook the review searches, screened for eligibility and assessed the quality of the included studies. MOF, MD and PC completed the data analysis. MOF prepared the draft of the systematic review, edited the draft of systematic review. MD read and approved the final manuscript.

7. COMPETING INTEREST STATEMENT

None declared

8. DATA AVAILABILITY STATEMENT

Data sharing not applicable as no datasets generated or analysed for this study

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Figure Legend

Figure 1. Identification of studies included in the review
Article selection (PRISMA-P) flow diagram.

Supplemental Data

Search Terms

The same search string was entered into each database. The Search terms for Embase for example were as follows:

Teaching OR learning OR instruction OR Education OR Training OR e-learning OR Platform

AND

LGBTQ inclusive OR Lesbian OR Gay OR Bisexual OR Transgender OR Queer

AND

Sex* OR Sexual Health OR Intimacy

Reporting checklist for systematic review and meta-analysis.

Based on the PRISMA guidelines.

Instructions to authors

Complete this checklist by entering the page numbers from your manuscript where readers will find each of the items listed below.

Your article may not currently address all the items on the checklist. Please modify your text to include the missing information. If you are certain that an item does not apply, please write "n/a" and provide a short explanation.

Upload your completed checklist as an extra file when you submit to a journal.

In your methods section, say that you used the PRISMAreporting guidelines, and cite them as:

Moher D, Liberati A, Tetzlaff J, Altman DG, The PRISMA Group. Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement

		Reporting Item	Page Number
Title			
	#1	Identify the report as a systematic review, meta-analysis, or both.	1
Abstract			
Structured summary	#2	Provide a structured summary including, as applicable: background; objectives; data sources; study eligibility criteria, participants, and interventions; study appraisal and synthesis methods; results; limitations; conclusions and implications of key findings; systematic review registration number	2
Introduction			
Rationale	#3	Describe the rationale for the review in the context of what is already known.	3
Objectives	#4	Provide an explicit statement of questions being addressed with	3

		reference to participants, interventions, comparisons, outcomes, and study design (PICOS).	
Methods			
Protocol and registration	#5	Indicate if a review protocol exists, if and where it can be accessed (e.g., Web address) and, if available, provide registration information including the registration number.	n/a
Eligibility criteria	#6	Specify study characteristics (e.g., PICOS, length of follow-up) and report characteristics (e.g., years considered, language, publication status) used as criteria for eligibility, giving rational	4
Information sources	#7	Describe all information sources in the search (e.g., databases with dates of coverage, contact with study authors to identify additional studies) and date last searched.	4
Search	#8	Present full electronic search strategy for at least one database, including any limits used, such that it could be repeated.	4
Study selection	#9	State the process for selecting studies (i.e., for screening, for determining eligibility, for inclusion in the systematic review, and, if applicable, for inclusion in the meta-analysis).	4
Data collection process	#10	Describe the method of data extraction from reports (e.g., piloted forms, independently by two reviewers) and any processes for obtaining and confirming data from investigators.	12
Data items	#11	List and define all variables for which data were sought (e.g., PICOS, funding sources), and any assumptions and simplifications made.	12
Risk of bias in individual studies	#12	Describe methods used for assessing risk of bias in individual studies (including specification of whether this was done at the study or outcome level, or both), and how this information is to be used in any data synthesis.	12
Summary measures	#13	State the principal summary measures (e.g., risk ratio, difference in means).	6
Planned methods of analyis	#14	Describe the methods of handling data and combining results of studies, if done, including measures of consistency (e.g., I2) for each meta-analysis.	12
Risk of bias	#15	Specify any assessment of risk of bias that may affect the	14

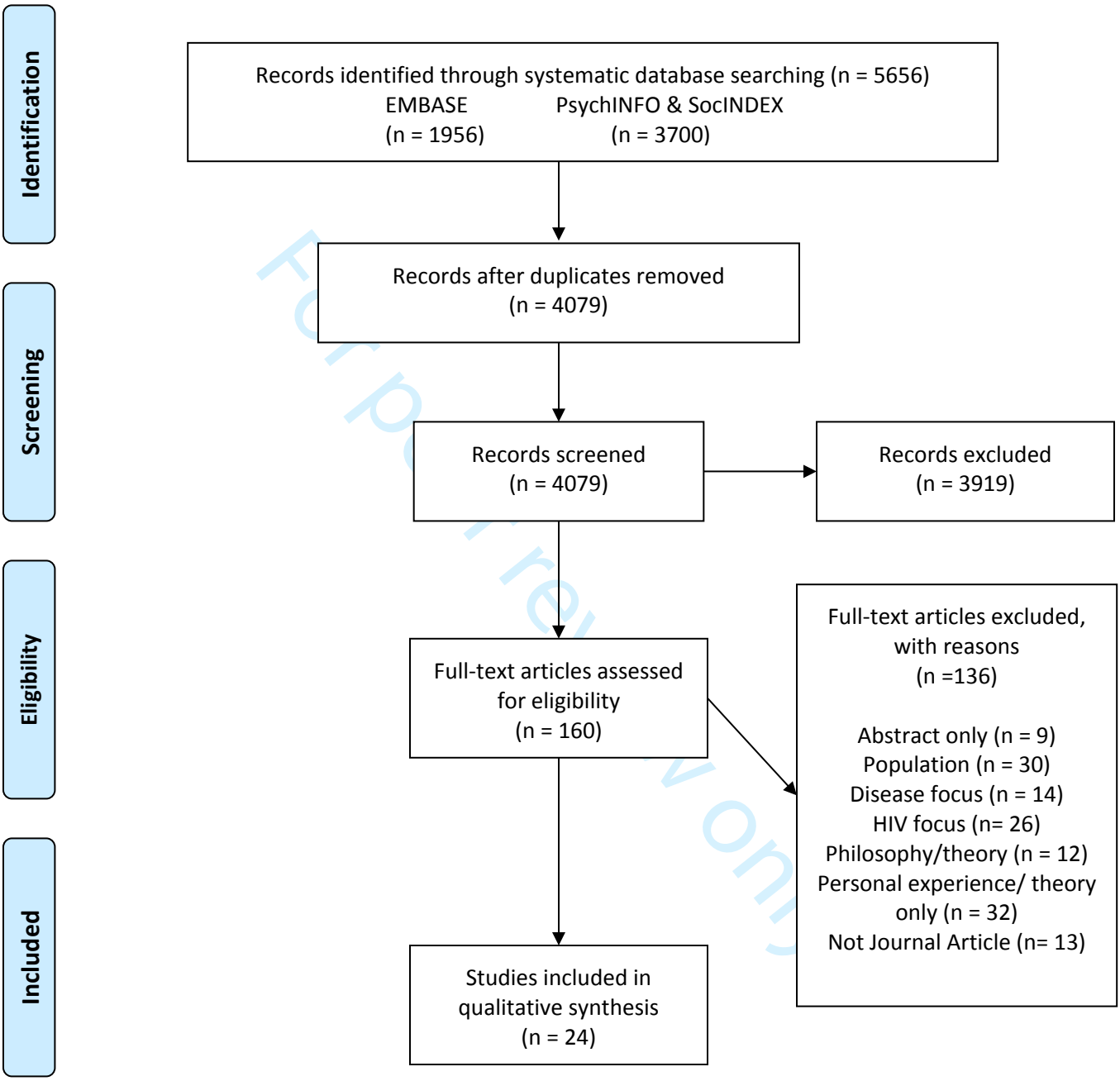
across studies		cumulative evidence (e.g., publication bias, selective reporting within studies).	
Additional analyses	#16	Describe methods of additional analyses (e.g., sensitivity or subgroup analyses, meta-regression), if done, indicating which were pre-specified.	n/a
Results			
Study selection	#17	Give numbers of studies screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally with a flow diagram.	5
Study characteristics	#18	For each study, present characteristics for which data were extracted (e.g., study size, PICOS, follow-up period) and provide the citation.	5
Risk of bias within studies	#19	Present data on risk of bias of each study and, if available, any outcome-level assessment (see Item 12).	5
Results of individual studies	#20	For all outcomes considered (benefits and harms), present, for each study: (a) simple summary data for each intervention group and (b) effect estimates and confidence intervals, ideally with a forest plot.	5
Synthesis of results	#21	Present the main results of the review. If meta-analyses are done, include for each, confidence intervals and measures of consistency.	14
Risk of bias across studies	#22	Present results of any assessment of risk of bias across studies (see Item 15).	5
Additional analysis	#23	Give results of additional analyses, if done (e.g., sensitivity or subgroup analyses, meta-regression [see Item 16]).	n/a
Discussion			
Summary of Evidence	#24	Summarize the main findings, including the strength of evidence for each main outcome; consider their relevance to key groups (e.g., health care providers, users, and policy makers	20
Limitations	#25	Discuss limitations at study and outcome level (e.g., risk of bias), and at review level (e.g., incomplete retrieval of identified research, reporting bias).	22

Conclusions	#26	Provide a general interpretation of the results in the context of other evidence, and implications for future research.	23

Funding

Funding	#27	Describe sources of funding or other support (e.g., supply of data) for the systematic review; role of funders for the systematic review.	23

Figure 1. PRISMA Flowchart of studies included in the review



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Examining LGBTI+ Inclusive Sexual Health Education from the perspective of both youth and facilitators: A Systematic Review

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Keywords:	EDUCATION & TRAINING (see Medical Education & Training), PUBLIC HEALTH, Health policy < HEALTH SERVICES ADMINISTRATION & MANAGEMENT, SEXUAL MEDICINE

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Title: Examining LGBTI+ Inclusive Sexual Health Education from the perspective of both youth and facilitators: A Systematic Review

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Word Count: 5361

Abstract

Objectives To critically appraise and synthesise the evidence in relation to both the receipt and delivery of LGBTI+ inclusive sexual health education.

Design A systematic review and narrative synthesis.

Data sources A systematic search of three online databases (EMBASE, PsychINFO and SocINDEX) from January 1990 to May 2021 was conducted.

Eligibility criteria Studies included were (1) Peer-reviewed; (2) English; (3) Quantitative, qualitative and mixed methods; that evaluated (4) inclusive sexual health in an educational or online setting; and (5) focused on training or educating. Studies were excluded if (i) the population was not LGBTI+ inclusive; (ii) the studies did not focus on original data; or (iii) the study was not available in full text.

Data extraction and synthesis The studies that met the inclusion criteria were assessed using the Critical Appraisal Skills Programme (CASP) tool. A narrative synthesis was then completed employing content analysis focusing on the results section of each article.

Results Of the 5656 records retrieved, 24 studies met the inclusion criteria. The majority of studies noted that both LGBTI+ youth and those who facilitate sexual health education are turning to online sources of information. Current sexual health education programmes operate mainly from a heterosexual perspective, creating a sense of exclusion for LGBTI+ youth. This is compounded by a lack of training, or provision of an inclusive curricula, resulting in facilitators feeling ill equipped or inhibited by their personal biases.

Conclusions LGBTI+ youth are not experiencing inclusive and comprehensive sexual health education. In parallel, educators report poor access to information, training and resources remain the primary reasons. There is a need to standardise sexual health curricula, making them LGBTI+ inclusive and incorporate holistic aspects of health such as pleasure and healthy relationships. Online approaches should be considered in the future, as they represent equality of access for both sexual health education professionals and LGBTI+ youth alike.

Strengths and limitations of this study

- The search strategy conducted utilised three distinct search engines to access journals with a biomedical, behavioural, and socio-cultural focus.
- A robust method of synthesis was employed examining both qualitative and quantitative approaches of any methodological design addressing LGBTI+ participants or educational training.
- The review includes only published, peer-reviewed studies in English and is thus susceptible to publication bias.
- It excluded grey literature (reports, conference proceedings or dissertations) and was limited to research from 1990 onwards.
- The voices of youth who identify as heterosexual and/or cisgender were not considered when determining the definition of inclusive sexuality education.

This work was supported by Department of Children and Youth Affairs, Ireland.

Keywords Systematic review, training, sexual, health, sexual health, inclusive sexual health education, LGBTI+ sexual health, online sexual health.

1. INTRODUCTION

Comprehensive sexual health education has been shown to delay the onset of sexual intercourse, reduce the incidence of human immunodeficiency virus (HIV), and reduce sexually transmitted infection rates among young people [1,2]. However, this has historically been conducted from a heteronormative perspective [3,4]. Studies have shown that early sexual experiences of LGBTI+ youth are different than their heterosexual counterparts. Many frequently disengage as they feel the sexual health information delivered in schools does not directly relate to them [5,6].

Internationally, governments and education policy makers continue to review best practice in the delivery of Relationship and Sexuality Education (RSE) [2,7,8]. Predominantly, the current syllabus focuses less on an individual's sexual health or sexual identity education and more on "relationships education and marriage preparation" [2]. Throughout the past decade, policy makers have considered the introduction of comprehensive, LGBTI+ inclusive RSE education with varying implementation rates worldwide [7]. A recent review highlighted that the inclusion of LGBTI+ faces resistance from parents, religious groups and political groups [7]. In terms of delivery, language, the organisation ethos and the specific facilitator viewpoint and capacity have been highlighted as either enablers or barriers to effective RSE delivery.

Research indicates that when LGBTI+ sexuality is included, it can be regarded as unhelpful by LGBTI+ youth due to a lack of appropriate LGBTI+ terminology and sexual health specific language relating to gender identity [4,5]. Language is not the only barrier in discussing sexuality, same sex practices and desires. Facilitators and educators have reported feeling less confident about discussing LGBTI+ issues due to a lack of resources and training on sexual health [3,5]. As a result, the information provided to LGBTI+ youth varies greatly across educational settings based on the facilitators own values and comfort with the subject [4,6]. For example, where facilitators were embarrassed to make mistakes in relation to discussing gender pronouns or explaining different genders such as non-binary, many chose not to talk about these topics at all [4,6].

There is a need to understand best practice with regard to the delivery of inclusive sexual health education and to develop appropriate training for professionals [4]. Evidence is needed to develop strategies that improve access to inclusive sexual health resources and training. The aim of this review is to critically appraise and synthesise the evidence available in relation LGBTI+ sexual health education for young people aged 16-23 years from the perspective of both the LGBTI+ youth and the professionals who deliver sexual health education in order to understand how best this can be improved.

Definitions

Young People- The term 'young people' for the purpose of this article refers to individuals aged between 16 years to 23 years. This age bracket represents the average ages for teenagers attending second and 3rd level education, also referred to as high school and college level education, who would be in receipt of sexual health education that covers sexual identity and sexual intercourse.

Facilitators- The term 'facilitator' is used for the purpose of this article to refer to those delivering sexual health education. This encompasses teachers, educators, trainers and any form of professional who delivers sexual health education.

2. METHODS

2.1 Search Strategy

A comprehensive literature search was conducted utilising the databases EMBASE, PsychINFO and SocINDEX. These databases were systematically searched for literature published between January 1990 and May 2021. This ensured a wide range of results, representative of international best practice. Each database was fully searched by MOF and MD using predefined search terms (See Supplementary File- Search Terms for Database). Any discrepancy in included studies was discussed in line with the pre-defined inclusion criteria with a third author (PC).

2.2 Study Eligibility and Selection

Articles published in English between 1990 and 2021 were included in the review if they were (i) peer reviewed journal articles; (ii) related to inclusive sexual health in an educational or online setting; (iii) focused on training or educating. English language content was chosen to ease assessment by a native English-speaking researcher. Peer-reviewed content was employed to identify international best practice regarding sexual health training methods and educational approaches. Both quantitative and qualitative studies were included to ensure a robust representation. Publications beginning from 1990 were chosen as this tracked sexual health development following the 1988 finding that Irish Law prohibiting homosexual activities were in breach of The European Convention on Human Rights [9].

Articles were excluded from the review if: (i) the population was not LGBTI+ inclusive; (ii) studies were based in philosophy or theory and/or (iii) the study was not available in full text (due to institution library subscriptions). Abstracts of included Studies were initially abstract reviewed in line with the above criteria and articles which did not meet these criteria were deemed ineligible following inspection. The final step involved reading the full text of each article in order to identify the final group of studies to be included. A PRISMA flow diagram presents the results in Figure.1.

2.3 Quality Appraisal

In total, 24 papers were critically appraised to ascertain the alignment of the research aim and methodology, and to evaluate the recruitment, settings, data analysis, ethical issues, findings, and contribution to knowledge. The individual studies were assessed for quality using the Critical Appraisal Skills Programme (CASP) tool [10] (See Table 1).

Table 1 Summary of studies included in the review

Source	CASP Score out of 10	Country Where Study Undertaken	Population and setting	Method/ data gathering	Aims/ Objectives	Key Findings
Glikman & Elkayam, (2019)	8	Israel	Students enrolled in various departments of a teacher-education college (n=264) Participants' mean age was 31.6years	Quantitative Used Surveys-Questionnaire	To understand the beliefs of college students on the importance of discussing the issue of sexual orientation with pupils, and in different educational settings.	-School counsellors were considered to be the most appropriate figure to discuss sexual orientation with students -Having witnessed homophobic behaviour enhanced the importance of education around this topic -Education students are not well informed on the subject of sexual orientation, either in terms of general knowledge or the tools available to them
Donovana & Hester, (2008)	7	United Kingdom	Four focus groups with lesbians, gay men, heterosexual women and men; and 67 interviews with heterosexual women and men, and those with experience of same-sex relationships regardless of how they defined their sexuality.	Multimethod research project Nationwide Survey-followed by Focus groups and Interviews	To compare love and violence in heterosexual and same-sex relationships.	-There are a limited number of places where young people can learn about relationships -Young people thinking about exploring alternate sexualities require inclusion in sex and relationship education -Need to focus on ideas, beliefs and expectations of love, care, equality, power, and

						intimacy regardless of gender and sexuality
Mustanski et al., (2014)	5.5	USA (online)	LGBTQI+ Youth aged 16-20 (n= 202)	Mixed methods Pre-test survey Intervention 2 weeks later- Post-test survey	To assess the feasibility, acceptability, and initial efficacy of an innovative online sexual health promotion program tailored for LGBTI+ youth.	-Participants reported learning more in this online programme then in school-based sex education -Most improved areas of learning reported were in relation to sexual functioning, HIV and STIs, and contraceptives
Buston &Hart, (2001)	7	Scotland	25 schools (non-denominational) co-educational state schools 60 lessons, teachers (n= 173), Pupils (n=7630)	Multi method evaluative study SHARE programme delivered over 3-year period (intervention) Or Sex Education "as usual" (control)	To establish if a specifically designed teacher led Sex Ed programme would reduce sexual risk taking.	-Heterosexism in school sex education does exist -Teachers report not having the language to discuss inclusive sex and sexuality education - Constraining factors to including LGBT in sex education identified at both school and societal level -Teachers own values prevent them from delivering non-heterosexist sex education
Rhodes, (2004)	6	United States (online)	Male chat room users (n=619) Web address and chat room name not published to protect participant identity	Mixed method Intervention 6 hours per day in chat group Chat transcripts analysed and coded for themes Demographic data analysed using SPSS	To explore an online intervention to reduce sexual risk in a chatroom frequented by men who have sex with men (MSM).	-Many men expressed interest in sexual risk reduction information -Chatters comfortable asking questions due to anonymity of online chatroom -Health educator was able to provide information on testing locations -Information sought from chatters in relation to: Coming out, youth resources,

						STI screening and condom use.
Hillier & Mitchell, (2008)	9	Australia	Same-sex-attracted youth (n=1749) 14–21 years old	A self-complete survey either online or in printed format Analysed Quantitative using SPSS Qualitative was coded in Excel	To examine whether same-sex-attracted young people are being exposed to appropriate and relevant sex education at school, and if they are not whether it is necessary that sex education be inclusive of sexual difference.	-Many of these youth were sexually active at an earlier age than their heterosexual peers -They were five times more likely to report having been diagnosed with an STI than their heterosexual peers -Accurate knowledge about STIs and pregnancy is needed
Gowen & Winges-Yanez, (2013)	9	Oregon, United States	LGBTQI+ participants (n=30) in two LGBTI youth organisations in Oregon	5 Semi-structured focus groups Digitally recorded and transcribed for analysis and coded into themes	To examine perspectives of LGBTI+Q youth on their experiences with school-based sexuality education in order to create a framework of LGBTI+Q-inclusive sexuality education.	-Current sexuality education is very exclusive of LGBTQ youth -Participants wish to experience discussions regarding gender and sexual orientation in order to feel directly acknowledged -No part of the existing curriculum was suggested for subtraction, only some additions and reframing of current materials was proposed
Baams et al., (2017)	7	Utrecht, Netherlands	Dutch adolescents (n=601) from 6 different high schools in grades 10-12 Representing urban, suburban, and rural areas	3 wave longitudinal research project The first wave was conducted in Fall 2014, followed by two subsequent measurements after 4 and 8 months This study focuses on the first and third measurement waves.	To examine whether the content or extensiveness of sexuality education at the beginning of the school year is related to a decrease in LGBTI+Q name-calling and an increase in the willingness to intervene when witnessing LGBTI+Q name-calling at the end of the school year.	-Sexual orientation and gender are rarely covered in sexuality education -There is a need to cover resources and how to access services in sexuality education - Teachers are believed to feel inadequate to teach about sexual diversity

MacMaster et al., (2003)	4	California, United States	Asian and Pacific Islander MSM in Santa Clara County, California. Number of participants and demographic data was not provided	Qualitative chat room discussions	To test the impact of an Internet based outreach to "high risk" MSM living in Santa Clara County.	-Successfully demonstrated the feasibility and impact of an internet-based programme to reach often over-looked at risk populations -Programme resulted in 46 referrals for HIV testing
Formby, (2011)	9	England, United Kingdom	Findings from 3 small studies drawn together LGBTI+ youth (n=375) aged 13-23 years	Qualitative Self-completion surveys and/or in-depth interviews/focus groups	To examine influences on sexual activity, conceptualizations/ understandings of sexual health and 'safe sex', and expectations in relation to safer sex.	-Young people would like discussion and information on same sex relationships in SRE -Ways to improve provision include well informed external speakers -Alcohol and drug use was a factor in sexual decision making -There is a need for appropriate sexual health information, and access to safer-sex supplies -Internet key to accessing sexual health information
Lindroth et al., (2017)	8	Sweden	Descriptive statistics from web-based survey (n=796) and qualitative interview study with transgender people (n=20) Total n=816	Mixed Methods Descriptive statistics from a previous web-based survey and previous qualitative interview study with transgender people were combined.	To explore and describe holistic sexual health and sexual health determinants among transgender people in Sweden.	-Not being able to fully live sexually as one wishes, and being dissatisfied with one's sex life have implications for everyday life -Access to gender confirming operations is described as a vital component for sexual health -Feelings of anxiety, uncertainty or fear in sexual situations hinders sexual health -More than one third reported not

						knowing where one can be treated with respect while getting tested for HIV and other STIs.
Sherlock, (2012)	5	Sweden and Ireland	Sexuality education professionals in Ireland (n= 17) and Sweden (n=17)	Qualitative Interviews	To examine the Socio-political influences on sexuality education in Sweden and Ireland.	-Both countries complain of sparse teacher training, curriculum updates and programme reviews -More research, discussions and engagements with sexuality education issues are needed in Ireland and Sweden -Policy barriers (religious) and gaps in curricular implementation require urgent attention and funding in both countries
DeHaan et al., (2013)	8	United States (online)	LGBTI+ youth (n=32) Ages 16–24	60-90-minute semi structured Interviews Transcribed into EthnoNotes a mixed method analysis program	To investigate the interplay between online and offline explorations of multiple dimensions of sexual health, which include sexually transmitted infections, sexual identities, romantic relationships, and sexual behaviour.	-LGBT population more likely to turn to the internet for information and connection -Internet is the main source of information -Youth actively searched online for offline services such as testing, Doctors and LGBT sensitive services -Youths open to receiving information online
Hobaica & Kwon, (2017)	8	Washington, United States	N=12 people from sexual minorities (SM) Sexual minorities included: lesbian, gay, bisexual, queer, pansexual, demisexual, and asexual	Qualitative study, 40-90 minute semi-structured interviews	To explore sexual minorities experiences of sexual health education.	Heteronormative sex education may contribute to poor physical health outcomes for SMs. -Participants reported that inclusive sex education would concurrently benefit heterosexual students -Inclusive curricula would increase

						self-esteem and confidence for SM students -Importance of incorporating role models of various identities into curriculums to reduce negative stigma
Riggs & Bartholomaeus, (2018)	9	Adelaide, Australia	Seven videos by transgender young people (n=5) aged 18-25	Analyse discussions of intimacy from the perspectives of transgender young people as narrated in a sample of YouTube videos	To examine what transgender young people would like to see covered in sexuality education.	-Sex education needs to address sexuality and gender, extending beyond heterosexual norms -As potential friends, classmates and intimate partners of their transgender peers, cisgender students should be educated in an inclusive manner -Educators and sex education programmes must develop ways of talking about bodies and intimacy with a more diverse approach to understanding gender and embodiment.
Abbott et al., (2015)	8	United Kingdom	8 semi-structured interviews with Relationship and Sexuality Education (RSE) teachers (n=2)	Qualitative discursive psychological approach used to analyse interview data	An Analysis of How Teachers Uphold Heteronormative Sex and Relationship Education	-Teachers reported those who engage in same sex relationships as isolated -Teachers require regular updating of their knowledge around sex, sexuality and issues affecting young people -Teachers need to be made aware of ways in which they can promote inclusivity
Hoefer & Hoefer, (2017)	7	Texas, United States	N=16 students at a southwestern University who identified as one or	Qualitative	To examine the impact of	-Particularly prevalent were messages in this education about

			more of the following: female, LGBT, or person of colour	recorded in-person interviews	abstinence-only sex education curricula	women, LGBTQ and sex as shameful and scary -These messages left long lasting impacts on the way participants felt about themselves, their peers, and sexuality. -Refusal to discuss LGBTQ issues allowed students to move into adulthood feeling confused and guilty
Halyey et al., (2019)	9	Seattle, United States	Transgender and nonbinary (TNB) youth (n= 11), parents (n=5) and healthcare affiliates (n=5) from Seattle Children's gender clinic	Qualitative In-depth interviews analysed using thematic analysis	To use insights of TNB youth, parents of TNB youth and healthcare affiliates to understand deficits in sex education experienced by TNB youth.	-TNB youth have unique sex education needs that are not commonly covered in standard sex education -Inadequate information leads TNB youth to seek information from potentially inaccurate, unfiltered sources -Negative outcomes had been experienced by many participants including STIs, pregnancy, unsafe binding, unsanitary sex toy use, and shame about their bodies and sexual desires Sex education needs to be inclusive and may need reframing to be trans-inclusive
Cahill et al., (2019)	9	United States	Youth Serving Professionals including: Adolescent health providers, school nurses, youth workers, and school educators (n=34)	Qualitative study	To explore barriers and facilitators that professionals face in delivering HIV preventive services and education.	-Educational materials should be free, disseminated in a variety of formats (online and downloadable), and evidence based -Tools should be specifically designed for youth and should involve

						peer education and use popular technologies -Training programme needs to include basics about sexual orientation, gender identity, and approaches for HIV risk reduction to enable the provision of affirming services
Pampati et al, 2021	9	International	Sexual and Gender Minority Youth [with a mean age of between 10 and 24 years]	Systematic Review	To synthesize the diverse body of literature on sexual and gender minority youth (SGMY) and sexual health education.	- A synthesis of the characteristics of inclusive sexual health education are detailed - Interventions in sexual health education covered a wide range of topics including HIV, STI's, risk reduction approaches, prosocial skills. - Content should be delivered via relatable individuals is crucial in terms of programme delivery.
Andrzejewski et al, 2020	8	United States	Websites with Sexual and reproductive health content for adolescents and young adults	Systematic Google Search	To characterise the strengths and weaknesses of sexual and gender minority related messages from websites that address sexual and reproductive health for young people.	- Websites regularly use aggregate terms to define the sexual health needs of all minority populations of constructs - Websites and messages sometimes conflate the constructs of sexual orientation and gender identity Few websites discuss topics of particular relevance to sexual and gender minority youth such as PrEP and PEP however the majority include

						information on pregnancy.
Carey, 2019	6	United States	Adolescent males interested in sex with males aged 14-17, cisgender, self-identify as gay, bisexual or are sexually attracted to males, reside in the US and had an e-mail address	Quantitative Study	To determine where adolescent males interested in sex with males receive sexual health information, clarify their preferences and explore relations with sexual behaviour	- Adolescents regularly (>66%) used websites for information regarding sex - Group required information on having safe and comfortable anal sex, types of sex, condoms, lubrication - Sexual health information should include visual representation, communication techniques, types of sexual behaviours and the influence of pornography
Formby & Donovan, 2020	9	England	Young people aged 14-25 years who identified as a gender or sexual minority	Qualitative study	To examiner what LGBT inclusive sex and relationships education should address in practice	- Young people reported varied experiences of sex and relationship education and the settings which they received the education were sometimes perceived as inherently homophobic - Pornography was sometimes used as a form of sex education by LGBT young people - Peer education was seen as a potentially useful resource when considering sex and relationship education
Narushima et al, 2020	8	Canada	Young people involved in the Youth Engagement Project in Canada	Qualitative study	To explore the perspectives and experiences of youth to identify the key elements of innovation, strength-focused and youth driven sexual health education that will	- Young people noted the importance of finding the LGBT community to gain acceptance - Sex education was noted as too

					reduce sexual health disparities among marginalised youth	biology based and heteronormative - Sex education needed to include sexual orientation, gender identity and relationships Support and discussion for parents and teachers is important to facilitate better education and support for young people

2.4 Data Synthesis

The papers comprised qualitative and quantitative study designs. There was a large degree of heterogeneity between included studies, a number of which were single pre-post test in design. It is not appropriate to conduct meta-analysis on studies that are at risk of bias or are too diverse, as the results can be misleading [11]. As such a narrative synthesis technique was employed, utilising the Popay et al. (2006) framework [12]. Narrative synthesis uses words and text to summarise and explore data from both quantitative and qualitative studies. Recommendations were followed about using specified search methods and organising the output as a synthesis, to 'tell a story.' The results sections of each paper were analysed by all three authors to identify evidence of the impact of sexual health education in a variety of contexts. First, a preliminary synthesis was developed. The same relevant data were extracted from all papers and tabulated. A content analysis with an inductive approach was then conducted which allows themes to emerge from the data (See Table 2). Two co-authors (MOF and MPD) proposed and defined categories following analysis. Any discrepancies were discussed with a third author (PC).

Table 2. Study Content Analysis

Content		**Study Reference Numbers**																							
Category	Themes in Data	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37
Online Learning	Students and facilitators seeking information online	√	√	√	√	√	√	√	√			√	√		√	√	√	√	√	√	√	√	√	√	√

	Need to utilise popular technologies e.g. YouTube		√													√						√		
	Web based/ Free online resources		√		√			√			√		√			√						√	√		√
	Internet acts as educator/ facilitator/ information source				√	√	√	√			√		√			√	√	√		√		√			√
	Equity of Access			√			√		√									√			√		√		
	Anonymity Online for users								√							√		√			√		√		
	Unaware where to access reliable info online		√		√	√										√	√	√							
Sexual Health Programme Components	Include different genders and sexual orientations	√	√	√	√	√		√	√	√			√	√	√	√	√		√	√	√	√			√
	Intimacy and Relationships	√		√					√			√	√	√					√	√				√	√
	Contraception and STIs		√	√	√	√						√	√	√		√				√	√	√		√	√
	Inclusive and supportive- Not heteronormative	√	√	√	√	√			√	√		√	√	√	√	√	√		√	√	√	√		√	√
	Physical and emotional health		√	√								√	√	√						√				√	√
	Students 'see themselves in curriculum'	√			√	√			√	√		√	√		√						√	√			
	Terminology and language important	√			√			√								√	√		√	√				√	
	Signposting to support services	√		√	√				√					√					√		√	√		√	
Facilitator Attributes	Facilitator characteristics e.g. Interpersonal Skills, listening skills	√		√			√			√					√			√	√				√	√	
	Personal bias/ core values			√	√			√		√	√			√				√			√				
	Comfort and ability to address issues of gender and sexuality			√	√		√			√	√			√	√				√				√	√	

	Feel unable/ not confident				√			√			√			√	√						√				
	Knowledge of sexual health information	√	√				√			√					√			√	√			√	√	√	
	Tone and delivery important	√		√				√	√	√					√				√						

In order to establish trustworthiness in the analysis, well-grounded methods, including thick description of the findings and maintaining a detailed audit trail were utilised by all three researchers. The narratives were read once before coding began for the researchers to familiarise themselves with the data. The researchers then coded the results section of each paper before these codes were grouped and summarised. These codes were then compared across authors and the relationship between codes were considered, in some cases leading to the amalgamation of separate categories under a superordinate group. Note that counting was not routinely applied in analysis, as a count is considered to convey that all codes warrant equal weighting [13].

2.5 Patient and Public Involvement

Patients and the public were not involved or required for the completion of this study.

2.6 Ethics Approval

Due to the nature of this type of research, ethical approval and review was not required.

3. RESULTS

3.1 Study Descriptions

The final twenty-four studies included twelve qualitative studies [14-25], three quantitative [26-28], seven mixed methods study designs [29-35] and two reviews [36, 37]. Fifteen of these focused on the experiences of LGBTI+ youth in various educational settings [16-18, 21, 23-25, 27-29, 31, 32, 34-37]. One referred to youth of all sexualities including heterosexual [22]. Four examined professional experiences of delivering sexual health education [14, 15, 22, 23]. One examined the impact of abstinence only sexual health education [16], one examined the content of reproductive and sexual health web sites for sexual and gender minority youth [37], and one examined sexual health online interventions in a men who have sex with men (MSM) chatroom [33]. Three main categories were

derived from the content analysis: 1) Online Learning, 2) Inclusive Programme Components, and 3) Facilitator Attributes.

3.2 Online Learning to Facilitate Accessible Equitable Sexual Health Education

The virtual world enables instant access to information at the touch of a button. Educators and youth alike were shown to be turning to online resources to seek out and access information on sexual health. Fifteen studies showed that young people are seeking sexual health information [14-21,24,27,29,30,32,34,35]. Of particular note, was the fact that young people are open to receiving information virtually, are familiar in engaging with online platforms, and are shown to learn effectively through this medium [14, 16-21, 23,28,31-35].

LGBTI+ Youth recognising themselves in the education provided

For LGBTI+ youth online access to information represents equality of access. Online sexual health information was shown to afford LGBTI+ youth control over their sexual health needs, allowing them to self- educate on topics not covered in traditional heterosexual focused sexual health education such as gender identities, sexualities, and surgical and non-surgical interventions for transgender individuals [17]. Specifically, LGBTI+ youth were shown to turn to the internet due to the value they place on their anonymity [17, 18, 20, 21, 30, 34]. This was described as being of significant importance for youth who report not seeking answers in group settings for fear of being inadvertently 'outed' [17, 19, 29].

While many LGBTI+ youth reported viewing the Internet as their main source of information in relation to sexual health, relationships and sexuality (Hillier), they were also shown to actively search online for a diverse range of offline services, including HIV and STI screening, where to purchase contraceptives and LGBTI+ friendly services [14, 16, 17, 20, 21, 27]. The ability to access sexual health information online was shown to result in increased sexual and emotional wellbeing for LGBTI+ youth [35], who report poorer levels of sexual health education and higher levels of dissatisfaction with their sex lives [32,33].

Not only does internet based sexual health education provide accessible and equitable sexual health outcomes for LGBTI+ youth, but seven studies also outlined the benefit of online education as a means of accessing difficult to reach and overlooked populations such as those in rural or remote locations [16, 17, 18, 20, 33, 35]. Another advantage of an online platform was the ability to interact with young people in real time. Where a chatroom-based intervention was offered, this uniquely allowed tailored messages to be provided to meet the specific needs of the young people [33]. Some disadvantages

were also noted such as the ambiguity for LGBTI+ youth on the best source of accurate, information online [30].

Facilitators having the capacity to deliver inclusive, accurate education

Thirteen studies found that facilitators were also seeking information and training tools online due to the lack of LGBTI+ inclusive information, resources, and training in the sexual health curriculums [14-18, 20, 23, 32-35]. They reported a need for web based and downloadable teaching resources, with the suggestion that sexual health websites have links to offline materials and supports [15, 16, 19, 20, 33-35]. There was a lack of awareness on the part of facilitators as to the best sources of information online, with an emphasis placed on the need to be able to download and transfer these resources to the education setting [16, 20, 33, 34]. Akin to LGBTI+ youth, facilitators also highlighted the need for trustworthy resources and online sources of information online, suggesting the need for a one stop website for all sexual health enquiries and training [15, 16, 20, 34].

Online learning as a mode of inclusive learning

The majority (n=13) of the studies concluded that online learning was both possible and highly effective [14, 15, 18-20, 23, 24, 27, 28, 32, 33, 35]. The results demonstrated the feasibility and potential impact of internet learning when consideration is given to a number of factors including internet connection, and that accuracy/bias of the source [17, 34]. In fact, LGBTI+ students in particular were shown to learn more from online than in school (15, 16, 18-20, 24, 27, 33-35].

In order for online learning to be as effective as possible a number of design elements were highlighted across the studies. The visual attractiveness of online platform was noted as important as it was key to engaging users and relaying the information [23]. Nine studies referenced the need for an online site to provide links to offline materials and supports, along with free resources disseminated in a variety of formats such as downloadable [15, 16, 18, 20-23, 26, 35]. Two studies suggested utilising existing sites used by LGBTI+ youth such as YouTube, as a way of offering information online that would reach specified groups, providing them with accessible and equitable access to information [15,25, 35]. However, two studies noted caution surrounding online sexual health education due to the propensity of some to use pornography as a form of education tool [24, 25].

3.3 The Programme Components of Inclusive Sexual Health Education

Overall, LGBTI+ youth reported dissatisfaction with the information included in sexual health education curriculums. The nature of sexual health education reported by participants across studies was predominantly heteronormative [14-22, 29-31, 34].

Current Relationship and Sexual Health Education Components

Current sexual health education focused on vaginal intercourse, pregnancy prevention and marriage. As a result, many LGBTI+ youth reported they felt the course material was not relevant to their lives. Sexual diversity in terms of sexuality, same sex relationships, and identity were not included in the majority of sexual health education topics [14, 16, 22-26, 31, 32, 35] , with restrictions described on topics such as sexual pleasure and what constitutes 'healthy' relationships [32]. Participants across studies described sexual health education as only focusing on the biological standpoint and lacking context [16, 32]. This resulted in LGBTI+ youth feeling vulnerable, unaccepted and 'less than' their heterosexual peers [18, 22, 24, 26].

Current sexual health education was also reported to focus on a medical and/or disease prevention methodology [20, 32]. While the majority of respondents across surveys reported the importance of receiving sufficient information to protect themselves against HIV and STIs [16, 18, 22, 23, 26, 27, 29, 31, 35-37], transgender respondents in particular were unaware of services they could access where they would be treated with respect and understanding while getting an STI screening [16, 23, 32]. Four studies found that young people were not given basic information about their bodies, reproduction or contraceptives [17, 19, 23, 32]; with some being advised to use condoms without ever being shown how [19, 32].

A common theme across studies related to LGBTI+ invisibility, marginalisation, or exclusion [14, 16, 20, 22, 23, 30, 33, 34]. Where LGBTI+ youth sought to be informed on relevant issues, they were reportedly met with what they described as 'homophobia', whereby facilitators failed to signpost LGBTI+ youth to relevant services or community groups [14, 16, 20, 22, 23, 24, 30-34]. As such many LGBTI+ youth described feeling isolated and ashamed of their sexuality and unaware of where to seek support and often reduced their engagement in any sexual health education [17, 20, 23, 28, 30, 32, 34].

The assumption that all youth are heterosexual immediately separates the information as not personally relevant for many same-sex attracted young people, resulting in their disengagement [16, 23, 29, 28]. Three of the studies found that LGBTI+ young people were unable to transfer the information they needed from classes on safe heterosexual sex to their own practice [16, 23, 29]. Notably, this was not the case in reverse, whereby heterosexual youth remained engaged when sexual

health information was delivered in an inclusive format [19, 23, 26]. In fact, the inclusion of LGBTI+ topics in sexual health education was shown to reduce stigma, foster self-esteem and limit negative mental health outcomes for LGBTI+ youth [14, 16, 17, 23, 34].

Components required for Inclusivity

The programme components required for inclusive sexual health education were discussed across studies. Sixteen studies found that sexual health education needs to encompass more than sex, puberty and pregnancy information [14-20, 23, 26, 27, 29-34]. Topics identified for inclusion into LGBTI+ inclusive sexual health included same sex relationships, LGBTI+ terminology, aspects of LGBTI+ questioning and signposting to services [14, 16-20, 25-29, 30, 36]. There is also a need to provide information regarding sexual orientation, gender identity and approaches for STIs [15, 19, 20, 25, 29, 30, 34, 36, 37], barrier protection methods [16, 18, 21- 23, 28, 31] and HIV risk reduction [16, 21, 22, 33, 36] . Twelve studies proposed that not only physical but emotional aspects of sexual health need to be discussed with young people to provide a holistic approach to sexual health education [14-18, 21-23, 25, 26, 29, 32, 34, 36, 37] . This would include discussing relationships, love and communication and creating awareness around feelings of anxiety and uncertainty [14-19, 23, 25, 28, 34, 36, 37]. In order to promote inclusivity, the use of resources representing sexual diversity in the classroom was considered paramount [14, 17-20, 22, 23, 26, 27, 29-34, 36].

Four studies indicated that youth who experienced education on respectful intimate relations were validated in who they were and reported an overall positive effect on their sexual health experiences [16, 19, 23, 31]. LGBTI+ young people were shown to have increased wellbeing as a result of seeing themselves in the curriculum [18, 22, 32,36]. Some studies identified the need to distance the discussion of relationships from gender and heterosexuality, and instead focus on beliefs, expectations of love, care equality and intimacy, regardless of gender [15, 17-19,23, 31]. In addition, six studies found that transgender youth needed more in-depth information around gender affirming interventions both medical and non-medical e.g. binding and 'bottom surgery' (this is a form of gender affirmation surgery) [14, 23, 30, 32, 34].

Thirteen studies reported that the tools employed for inclusive sexual health education should involve peer education, resources with youth representation, and popular technologies [14-18, 20, 23-25, 33-35] . To improve the provision of services, fifteen studies pointed to the need for well-informed external speakers or educational resources [15-19, 21-23, 26,29-33, 35]. These studies also addressed the need for education materials to be evidence based, free, and disseminated in a variety of formats, including online [16, 22, 31, 32-34, 35]. Six studies elucidated the importance of taking account of

learning styles and promoted learning in different ways such as role playing, discussion, and watching videos [16, 20-23, 26]. Three studies addressed the need to discuss what Is perceived as important by youths in smaller groups [16, 20, 21]. These also highlighted the benefit of mixed groups where applicable to allow for the integration of all genders and sexualities [16, 20, 21].

In order to build capacity, the need for practical demonstrations and communication around condoms to reduce risky decision making was considered of particular importance [14, 16, 17, 19, 23, 31, 32, 34]. Approaches across eight studies identified common multidisciplinary needs and identified ways to equip professionals to deliver effective sexual health education [14, 16, 17, 21, 23, 31, 34, 35]. In particular, they noted the need for the implementation of policies to reduce sexual health disparities, and the introduction of a standardised curriculum whereby professionals are equipped with appropriate knowledge relating to sexual health [17, 21-23, 31, 34].

3.4 Defining the Facilitator Attributes necessary for Inclusive Learning

Personal values, comfort levels and access to information and training can impact on facilitator ability to deliver inclusive sexual health education. In a school context, educators were reported as crucial in creating an inclusive environment and in setting the tone for the way discussions are held [14, 15, 19, 21-23, 26, 27,36] . Current facilitators often complained of sparse teacher training, and lack of curriculum updates for their poor knowledge and comfort levels in relation to delivering comprehensive sexual health education [15-23, 26, 27, 30], with this argument used by some to justify a need for external facilitators [17, 21, 27].

Attributes which act as a barrier to learning

A large percentage of studies found facilitators were ill equipped to talk about sexual health with young people due to their own discomfort with the subject matter combined with a lack of training [14, 17, 21, 22, 27, 29, 30, 32]. Particular attributes were identified as being unhelpful in the delivery of inclusive sexual health information. These included a lack of appropriate LGBTI+ language and terminology, which was shown to reinforce heteronormalizing practice [14, 15, 21, 32]. Facilitators were also shown to mainly deliver sexual health from a binary perspective (male and female) excluding some LGBTI+ youth including non-binary and intersex communities. Studies highlighted the need for facilitators to develop an approach to speaking about bodies that utilised gender neutral or re-gendered language [14, 21, 32]. They suggested that this language encompass sexually transmitted infections and pregnancy due to dysphoria experienced by some LGBTI+ youth who do not see their genitals as vagina or penis [21, 32].

There was also a reported ambivalence and anxiety on the part of some facilitators to deliver inclusive sexual health due to their own inherent stigma or perceived inability to address such topics due to lack of information and training [29, 31]. In fact, training and lack of information/resources to help in the delivery of sexual health was the main reason identified by facilitators as to why they felt unable and ill equipped to deliver LGBTI+ inclusive sexual health education [14,17-19, 21, 35].

Enabling attributes of youth education in sexual health

The positive attributes and skills utilised by facilitators that were seen as beneficial to the delivery of sexual health education were also discussed. These included interpersonal skills, listening skills, acceptance, and the ability to provide emotional support [19, 20, 23, 26, 29, 31]. Some facilitators reported applying existing skills such as listening, containment and acceptance when trying to conduct sexual health workshops as this was not provided to them in terms of sexual health training. The tone and manner used to deliver sexual health was also noted as important in how it is received by young people. Facilitators who appeared comfortable with the subject matter and utilised a steady, confident, and warm tone were regarded as most effective in their delivery of sexual health information [15, 21].

The ability to appear approachable and knowledgeable of same sex relationships was also considered an important attribute, as LGBTI+ youth linked these with the facilitators ability to validate same sex relationships and different gender identities [16, 19, 26, 27, 29, 30]. In particular interpersonal skills such as the ability to listen and accept were highlighted as most beneficial as these enabled the facilitator to build capacity in both themselves and young people by demonstrating openness and acceptance of others, and adapting to new information and ways of thinking [14, 18-21, 32, 35].

Differing attributes among facilitators can severely impact on a young person's experience of sexual health education. This variation in experience is highlighted across studies in the need for standardised sexual health policies and curriculums [15, 20-23, 26, 30, 35]. Those tasked with the delivery of sexual health education programmes require training and upskilling of their knowledge on sex, sexuality and LGBTI+ specific sexual health information, and training to promote better interpersonal and listening skills [14, 15, 17, 19-21, 23, 30]. This would enable facilitators to deliver an inclusive curriculum in a supportive environment that takes account of young people's varying sexual identities, relationships and sexual health needs [14, 15, 17, 21, 22, 27, 30, 35].

4. DISCUSSION

Sexual health is an important aspect of overall health [38]. Therefore, inclusive and comprehensive sexual health information should be accessible to all. This review provided a clear overview of the nature of sexual health education as it exists currently. In the absence of inclusive, standardised sexual health education, both young people and facilitators are turning to online platforms to access information and resources. Sexual health education programmes need to be re-designed for the successful delivery of LGBTI+ inclusive sexual health education and the attributes that can impact facilitator delivery need to be considered and addressed.

These findings add to the growing picture of LGBTI+ youth experiences of sexual health, and the constructed heterosexual culture created by education providers and society at large. The former is characterised by high levels of invisibility and marginalisation prominent in LGBTI+ youth accounts of schooling [16, 17, 23, 26, 29]. Previous research notes how "sex education is one very effective way in which the heteronormative status quo is maintained" [39]. Sex education has remained stagnant throughout the past number of decades despite liberation of many peripheral areas. This has led "to criticism of inclusivity, morals, and ethics and other criticism; however, it has yet to become all-inclusive, comprehensive, and effective" [39]. This is compounded by inadequate information offered to youths, often associated with staff attitudes/behaviours or insufficient training [14-16, 29]. Throughout this synthesis both youth and facilitators noted the internet as their main source of information about LGBTI+ sexual health and services [14-19, 21, 23, 30-35]. This is complimented by findings of Magee et al, (2011) which suggests that LGBTI+ youth often turn to the internet for relevant sexual health information [40]. Given the lack of comprehensive, LGBTI+-relevant sexual health information available to these youths, the internet represents a crucial, yet underdeveloped setting to provide this information. These findings highlight the need for the provision of evidence based, inclusive, online resources for youth to safely and securely access accurate sexual health information. This would represent equality of access for all young people enabling them to access inclusive information from any location and at any time of their choosing. Equally online training for facilitators would enable direct and standardised training of all those providing sexual health education, and the ability for updated information to reach those delivering in an effective manner.

The need for sexual health education to extend beyond heterosexual norms was also paramount across the studies included in this synthesis. Facilitators and sexual health education programmes must develop ways of talking about bodies and intimacy that shift attention away from the normative association of particular genders with particular anatomies, to encompass a more diverse approach to understanding gender and embodiment in order to make an inclusive programme for all. This can

be seen in the curricula in New Zealand, where gender is not discussed as binary, and gender identities and diversity are explored [41]. The studies examined called for inclusive sexual education, inclusive of information on condoms, relationships, and communication [14-19, 21-23, 26, 27, 30-32, 34]. In addition, previous research highlights that the inclusion of LGBTI+ issues has positive effects on all sexualities [7]. Previous research has shown this type of education increases healthy sexual behaviour in the general student population [2, 41-51]. It is possible therefore, that similar behaviour changes could be expected for LGBTI+ youth with the introduction of a comparable LGBTI+ inclusive sexual health programme.

The results of this synthesis also demonstrate that facilitators differ in their ability to deliver inclusive sexual health due to a lack of knowledge and personal values/beliefs in relation to sexual diversity [14-19, 23, 26, 27, 29, 30, 34, 35]. The main obstruction reported was access to training and resources. This is in keeping with findings from the Netherlands which found that school programmes do not provide supportive and affirming messages, and educators feel ill equipped to address LGBTI+ topics [50]. As far back as 2008, Kirby demonstrated comprehensive sexual health had significant effects on delaying initiation of sex and increasing condom and contraceptive use [48]. As such it is crucial that inclusive, comprehensive sexual health education be available to both students and facilitators and that sexual health curriculums are designed to standardise this for all young people.

Overall, this synthesis demonstrated that sexual health education needs to encompass more than sex, puberty, and pregnancy [14-19, 21-23, 27, 29-31, 34]. This supports previous research findings that all students require applicable, informative sexual health education, and that inclusive information is acceptable to all, unlike heteronormative education [52]. As the virtual world we live in becomes the new norm for teaching and training, it appears clear that sexual health education needs to adapt not only in terms of content but in terms of delivery. The lack of inclusive sexual health education in school settings can only be addressed if those who are facilitating these programmes are trained and provided with the appropriate resources to do so. In order to do this, the internet appears to be the most obvious platform for both educators and youths to access information. Therefore, online platforms should be utilised by policy makers to train, educate and offer resources for the LGBTI+ community along with those who are responsible for the delivery of this education such as teachers and facilitators.

The findings of this review signal the requirement for sexual health policy and educational bodies to standardise an LGBTI+ inclusive curriculum for young people, ensuring facilitators are provided with adequate training and upskilling to deliver it effectively, and that this training and information is made accessible on a secure, national platform [14-19, 23, 35]. These findings also have implications for

practice, whereby the means by which sexual health education training is accessed by professionals will be fully online, removing any disparities between rural and central locations [20, 26, 33]. This will also enable those accessing training to do so at times suitable to their individual schedules and feel confident in their ability to access information at any time from a reliable source as required.

Further research is needed to better understand the ability of online training to address the need for inclusive sexual health education. Such research should examine the types of platforms sexual health information is delivered on, and how these are advertised, in order to reduce equality of access and information for young people and professionals. Research is also required in relation to the ability of online training to address the disparities that result due to negative facilitator attributes. Such research would help to further standardised inclusive sexual health education across school settings, reduce stigma and foster inclusion for LGBTI+ young people in the school environment.

4.1 Strengths and Limitations

This review gives a broad overview of best practice in relation to sexual health education for LGBTI+ youth. A search strategy was conducted using three different search engines to access journals with a varying biomedical, behavioural and socio-cultural focus. A robust method of synthesis was employed examining both qualitative and quantitative approaches. The resulting synthesis can be used to help guide future intervention development.

This review has a number of limitations. The inclusion of Medline as a fourth search engine, may have increased the comprehensiveness of the search. The review includes only published peer-reviewed studies in English and is thus susceptible to publication bias. Including studies of varying quality could yield misleading results. In terms of the included studies a number of limitations were noted. The majority did not discuss the relationship between the researcher and the participants. In addition, pre-defined sample size calculations were not reported in all studies. This review excluded grey literature (reports, conference proceedings or dissertations) and was limited to research from 1990 onwards. This review did not account for the use of or absence of theoretical models within sexual health education programmes and their ability to change behaviours, something that should be considered in future research. In addition, the voices of youth who identify as heterosexual and/or cisgender should also be considered when determining the definition of inclusive sexuality education.

4.2 Conclusions

LGBTI+ youth are currently not experiencing inclusive and comprehensive sexual health education. Poor access to information, training and resources remain the primary reasons this is not being delivered. In order to address this, future interventions would benefit from utilising online approaches

that facilitate learning for all. Online training for sexual health education providers would offer unprecedented access to inclusive, comprehensive sexual health information removing any geographical barriers or disparities. The provision of such training online would also enable any updates to information or practice to be directly accessed by those providing sexual health education. This could more comprehensively serve the needs of both the LGBTI+ community and those responsible for providing accurate, comprehensive sexual health education.

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6. CONTRIBUTERS

MOF AND MD designed the review, undertook the review searches, screened for eligibility and assessed the quality of the included studies. MOF, MD and PC completed the data analysis. MOF prepared the draft of the systematic review, edited the draft of systematic review. MD read and approved the final manuscript.

7. COMPETING INTERESTS

All authors have completed the Unified Competing Interest form at http://www.icmje.org/coi_disclosure.pdf (available on request from the corresponding author) and declare that (1) MOF, MD and PC all work in the area of Sexual Health, delivering inclusive sexual health workshops and educational interventions to groups. (2) Funding was received from DCEDIY to pay for the research post held by MOF.

8. DATA AVAILABILITY STATEMENT

All data relevant to the study are in included in the article or uploaded as supplementary information. Data sharing not applicable as no datasets were generated and/or analysed for this study.

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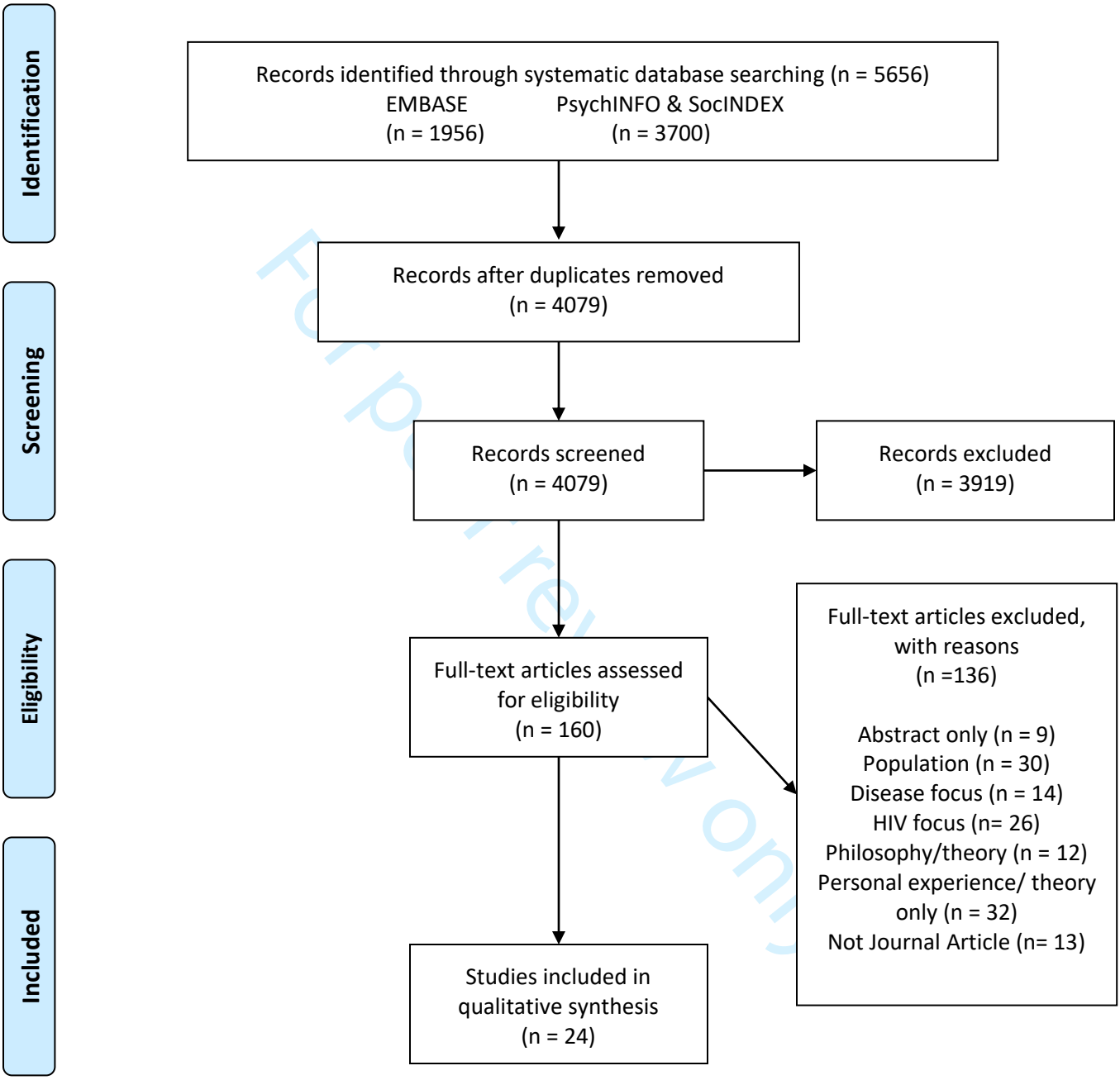
Figure Legend

Figure 1. Identification of studies included in the review
Article selection (PRISMA-P) flow diagram.

Figure 1. PRISMA Flowchart of studies included in the review



Supplemental Data

Search Terms

The same search string was entered into each database. The Search terms for Embase for example were as follows:

Teaching OR learning OR instruction OR Education OR Training OR e-learning OR Platform

AND

LGBTQ inclusive OR Lesbian OR Gay OR Bisexual OR Transgender OR Queer

AND

Sex* OR Sexual Health OR Intimacy

Reporting checklist for systematic review and meta-analysis.

Based on the PRISMA guidelines.

Instructions to authors

Complete this checklist by entering the page numbers from your manuscript where readers will find each of the items listed below.

Your article may not currently address all the items on the checklist. Please modify your text to include the missing information. If you are certain that an item does not apply, please write "n/a" and provide a short explanation.

Upload your completed checklist as an extra file when you submit to a journal.

In your methods section, say that you used the PRISMAreporting guidelines, and cite them as:

Moher D, Liberati A, Tetzlaff J, Altman DG, The PRISMA Group. Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement

		Reporting Item	Page Number
Title			
	#1	Identify the report as a systematic review, meta-analysis, or both.	1
Abstract			
Structured summary	#2	Provide a structured summary including, as applicable: background; objectives; data sources; study eligibility criteria, participants, and interventions; study appraisal and synthesis methods; results; limitations; conclusions and implications of key findings; systematic review registration number	2
Introduction			
Rationale	#3	Describe the rationale for the review in the context of what is already known.	3
Objectives	#4	Provide an explicit statement of questions being addressed with	3

		reference to participants, interventions, comparisons, outcomes, and study design (PICOS).	
Methods			
Protocol and registration	#5	Indicate if a review protocol exists, if and where it can be accessed (e.g., Web address) and, if available, provide registration information including the registration number.	n/a
Eligibility criteria	#6	Specify study characteristics (e.g., PICOS, length of follow-up) and report characteristics (e.g., years considered, language, publication status) used as criteria for eligibility, giving rational	4
Information sources	#7	Describe all information sources in the search (e.g., databases with dates of coverage, contact with study authors to identify additional studies) and date last searched.	4
Search	#8	Present full electronic search strategy for at least one database, including any limits used, such that it could be repeated.	4
Study selection	#9	State the process for selecting studies (i.e., for screening, for determining eligibility, for inclusion in the systematic review, and, if applicable, for inclusion in the meta-analysis).	4
Data collection process	#10	Describe the method of data extraction from reports (e.g., piloted forms, independently by two reviewers) and any processes for obtaining and confirming data from investigators.	12
Data items	#11	List and define all variables for which data were sought (e.g., PICOS, funding sources), and any assumptions and simplifications made.	12
Risk of bias in individual studies	#12	Describe methods used for assessing risk of bias in individual studies (including specification of whether this was done at the study or outcome level, or both), and how this information is to be used in any data synthesis.	12
Summary measures	#13	State the principal summary measures (e.g., risk ratio, difference in means).	6
Planned methods of analyis	#14	Describe the methods of handling data and combining results of studies, if done, including measures of consistency (e.g., I2) for each meta-analysis.	12
Risk of bias	#15	Specify any assessment of risk of bias that may affect the	14

across studies		cumulative evidence (e.g., publication bias, selective reporting within studies).	
Additional analyses	#16	Describe methods of additional analyses (e.g., sensitivity or subgroup analyses, meta-regression), if done, indicating which were pre-specified.	n/a
Results			
Study selection	#17	Give numbers of studies screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally with a flow diagram.	5
Study characteristics	#18	For each study, present characteristics for which data were extracted (e.g., study size, PICOS, follow-up period) and provide the citation.	5
Risk of bias within studies	#19	Present data on risk of bias of each study and, if available, any outcome-level assessment (see Item 12).	5
Results of individual studies	#20	For all outcomes considered (benefits and harms), present, for each study: (a) simple summary data for each intervention group and (b) effect estimates and confidence intervals, ideally with a forest plot.	5
Synthesis of results	#21	Present the main results of the review. If meta-analyses are done, include for each, confidence intervals and measures of consistency.	14
Risk of bias across studies	#22	Present results of any assessment of risk of bias across studies (see Item 15).	5
Additional analysis	#23	Give results of additional analyses, if done (e.g., sensitivity or subgroup analyses, meta-regression [see Item 16]).	n/a
Discussion			
Summary of Evidence	#24	Summarize the main findings, including the strength of evidence for each main outcome; consider their relevance to key groups (e.g., health care providers, users, and policy makers	20
Limitations	#25	Discuss limitations at study and outcome level (e.g., risk of bias), and at review level (e.g., incomplete retrieval of identified research, reporting bias).	22

Conclusions	#26	Provide a general interpretation of the results in the context of other evidence, and implications for future research.	23

Funding

Funding	#27	Describe sources of funding or other support (e.g., supply of data) for the systematic review; role of funders for the systematic review.	23