



# Development and application of a framework for classifying stakeholder roles in co-creation research: a Health CASCADE study

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## Abstract

**Aim** Given the diversity of stakeholder engagement in co-creation research and the absence of an operational classification of stakeholder roles, this study aimed to develop a classification framework for co-creator roles and demonstrate its practical application in classifying stakeholder engagement.

**Subject and methods** To develop the co-creation roles framework, we searched Google Images and Google Scholar to identify concepts and frameworks relevant to co-creation roles. To demonstrate its application, we applied the framework to classify stakeholder roles in studies on youth co-creation in public health interventions. Studies were identified through a systematic review using four databases (OVID/Medline, Ebsco/APA PsycINFO, Ebsco/CINAHL, Elsevier/Scopus), following PRISMA guidelines and registering the protocol on PROSPERO (CRD42024628813).

**Results** The Google Images and Google Scholar search yielded five articles addressing co-creation role elements such as ‘stages of co-creation’ and ‘stakeholder levels of engagement’. The systematic review included 39 articles describing  $n = 19$  youth-focused public health projects underpinned by co-creation ( $n = 9$ ), youth participatory action research ( $n = 7$ ) or community-based participatory research ( $n = 3$ ), revealing stakeholder engagement at multiple levels.

**Conclusion** This study presents an operational classification framework for describing co-creation roles among diverse stakeholders, providing a practical approach to improving transparency and comparability across co-creation research.

**Keywords** Systematic review · Co-creation · Participatory research · Stakeholder engagement

## Introduction

Co-creation research has been gaining substantial traction in many fields, such as management, organisational design and public health (Degnegaard 2014), which is largely due to its wide array of acknowledged benefits, including improved relevance, acceptability and adherence to interventions. Relatedly, a paradigm shift has moved away from viewing stakeholders as passive recipients towards recognising them as sources of competence, lived experience and equity, thereby positioning them as active in the design and

implementation of solutions (Agrawal and Rahman 2015). In this regard, co-creation research encompasses collaborative problem-solving among diverse stakeholders across all stages of the research process, from problem identification and intervention development to implementation and evaluation (Messiha et al. 2023; Vargas et al. 2022).

That said, the prominence of co-creation research accompanies evident challenges, extending to issues such as concept stretching, knowledge fragmentation and inconsistent understandings of how co-creation should be operationalised in practice (Messiha et al. 2023, 2025). In particular, the interchangeable use of terms such as co-creation, co-design, participatory action research (PAR) and community-based participatory research (CBPR) can create ambiguity about the distinct roles of stakeholders, which may vary widely across projects and research fields.

In participatory health research, stakeholder roles are described as co-researchers, with community members actively engaged in data generation, interpretation and sometimes even dissemination of findings (cf. Anselma

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et al. 2019) or more narrowly as consultants, with community members contributing experiential knowledge or feedback at discrete stages of the research process, such as study design or interpretation of results (cf. Breen and O'Connor 2014). A systematic review of the higher education context, identified stakeholders as co-producers, participants, change agents and partners (Zarandi et al. 2022) and a literature review on value co-creation within the management field identified roles as co-innovator, co-ideator, co-producer, co-designer, co-developer and co-promoter (Agrawal and Rahman 2015:147). Attending to the different roles of stakeholders may be important, as it carries implications for power, ownership of knowledge and the extent to which research can genuinely reflect upon community priorities.

Previous studies have demonstrated a lack of guidance regarding evaluating and reporting co-creation research, particularly with respect to stakeholder roles, reducing transparency and comparability across studies (Pearce et al. 2023; Longworth et al. 2024a). A lack of a clear description of who is engaged, in what capacity and at which stages of the research process hinders our understanding of co-creation (Lazo-Porras et al. 2020) and how stakeholder roles and responsibilities translate—or fail to translate—into outcomes and impact (Sjödén et al. 2016:108). While author contribution frameworks such as CRediT can support transparent documentation of individual or stakeholder group contributions (e.g. conceptualisation, data curation, analysis and writing), their orientation towards conventional academic contribution models may limit their ability to capture the relational and iterative characteristic of co-creation research roles. To our knowledge, no studies have explicitly defined stakeholder roles within co-creation research processes or consolidated these roles in terms of their nature, scope and locus of engagement (Grönroos and Voima 2013). Such a classification of stakeholder roles is important for researchers to structurally describe, plan and report stakeholder engagement in co-creation research, as well as for stakeholders to offer clarity regarding anticipating roles and engagement levels throughout the research process. Therefore, this study aimed to develop an operational classification framework for describing co-creation roles of stakeholders across multiple research fields.

Secondly, and in line with the goals of the public health-related Health CASCADE project (<https://healthcascade.eu/>), this study aimed to demonstrate the framework's practical applicability by using it as a structured template to systematically summarise and classify stakeholder roles within research focused on the co-creation of public health interventions. Particular attention is given to studies engaging with youth (aged 4–18 years) as key stakeholders, as existing evidence suggests that engaging youth in health research can enhance the relevance and potential impact of the research, yet youth's roles within co-creation research processes vary

considerably and are often insufficiently specified (McCabe et al. 2023; Bailey et al. 2024; Meshkovska et al. 2025; Mawn et al. 2016; Perowne et al. 2024).

## Methods

This study comprised two methodological stages. Firstly, an operational co-creation roles framework was developed through a synthesis of published co-creation concepts and frameworks to identify and organise stakeholder role elements. Secondly, the framework was applied to youth-focused public health co-creation studies identified through a systematic review to evaluate its application in classifying stakeholder roles.

### Framework development

The framework was developed through an iterative synthesis of published co-creation concepts and frameworks, similar to the approach of De Koning et al. (2016). This stage aimed to identify the necessary conceptual elements underpinning stakeholder roles across diverse co-creation contexts, enabling their integration into a structured operational classification framework.

To identify relevant concepts and frameworks, the lead author (KM) searched Google Images and Google Scholar using the terms 'co-creation' AND 'roles'. Google Images was used to identify visual models and frameworks from academic and grey literature, while Google Scholar was used to identify published frameworks, models and constructs relating to stakeholder roles in co-creation. Searches were conducted up to March 2024 without restrictions on language, discipline or publication type and continued iteratively until no additional concepts or frameworks relevant to stakeholder roles were identified.

Sources were considered for inclusion if they (1) described the nature or level of stakeholder roles in co-creation and (2) contributed distinct conceptual elements not already represented in the developing framework. Sources were considered for inclusion if they described stakeholder engagement in co-creation by providing the necessary conceptual information on stakeholder roles, including their role in the research process and how they were engaged. Where multiple sources described (a) similar conceptual element(s), the element was represented once within the framework to avoid conceptual duplication. The conceptual elements extracted from the included sources were compared, consolidated into preliminary framework domains and iteratively refined during deliberative meetings between KM, MC and TA until consensus on the framework elements and structure was reached.

## Usability of the framework

To evaluate the usability of the framework in classifying the roles in co-creation research, we conducted a systematic review, reporting the related steps following the PRISMA guidelines, with the protocol registered on PROSPERO (ID = CRD42024628813). As mentioned before the focus was on studies co-creating public health interventions for and together with youth.

## Search strategy

Systematic electronic database searches were conducted by medical library specialist HK in consultation with lead author (KM) in four scientific databases: OVID/Medline (14 Nov 2024), Ebsco/APA PsycINFO (14 Nov 2024), Ebsco/CINAHL Plus (14 Nov 2024) and Elsevier/Scopus (15 Nov 2024). The search included key terms pertaining to ‘co-creation’ or ‘youth participatory action research’ or ‘community-based participatory research’. Since interventions specifically focused on youth were of interest, we also included key terms related to youth such as ‘child’, ‘adolescent’ and ‘paediatric’ as concerned with the youth range of 4–18 years of age and with a date limit of 2012 to current. No restriction was given to methodology or language. The search strategy was trialled in August 2024 and finalised on 18 November 2024. Refer to *Appendix A* in relation to the full search strategy.

## Inclusion criteria

We included original empirical articles explicitly mentioning they applied co-creation (or youth-led/youth-centred participatory research/YPAR or CBPR/community-based participatory action research) to develop a public health intervention (or action or programme) for and together with youth aged 4–18 years. Furthermore, articles were only included when youth participants were the primary stakeholders in the research process, meaning that the intervention should be specifically designed for and with the youth as the primary beneficiary. While articles may also involve secondary stakeholders, such as teachers, parents, community members or health professionals, youth must be prioritised in the research.

## Screening and selection of articles

We employed ASReview to facilitate the screening process. ASReview was used solely to prioritise the order in which records were screened. ASReview is a systematic review tool that utilises active learning, whereby users initially label a small subset of articles ( $n = 2$ ) to train the algorithm in predicting the relevance of the remaining

items (cf. van Dijk et al. 2023). Therefore, this tool leverages machine learning to prioritise the most pertinent articles, rendering the screening process more efficient than conventional manual approaches (IBID). The lead author (KM) had prior experience using ASReview, ensuring efficient implementation and reducing the risk of errors associated with unfamiliarity (Agnello and Loisel et al. 2023).

KM initiated the active learning process using the standard ASReview workflow by providing one relevant and one irrelevant record as the initial training set. The model was subsequently updated iteratively following each screening decision, continuously refining the prioritisation of the remaining records. Subsequently, KM screened the titles and abstracts (TIAB) of the first 100 records prioritised by the ASReview active learning algorithm following the initial training phase. Again after each screening decision, the model was updated and re-ranked the remaining records according to their predicted relevance. To ensure consistency in screening decisions, MC and TA independently reviewed the exclusion reasoning for 50 of these records each. Where the title and abstract provided insufficient information to determine eligibility, the full text was consulted to confirm final eligibility. Any discrepancies were resolved through discussion until consensus was reached. Before continuing the screening process, the full texts of all records provisionally included following TIAB screening were reviewed to confirm their final eligibility.

Thereafter, the full texts of the remaining records (8343 articles) in ASReview were screened by KM following two predefined stopping criteria: (1) screening 20% of all retrieved records (i.e. 1669 of 8343 articles) and (2) encountering 100 consecutively screened irrelevant records. These stopping criteria were specified a priori to balance screening efficiency with minimising the likelihood of missing potentially eligible studies.

Articles lacking abstracts were not processed through ASReview but were manually assessed by KM using the inclusion criteria. Backward and forward reference searching of included articles was undertaken to identify additional publications relating to projects already included in the review. These articles were assessed in full text by KM and RW and were included only if they met the predefined inclusion criteria and contributed additional information relevant to the application of the co-creation roles framework.

To verify that relevant studies had not been incorrectly deprioritised by the active learning model, KM assessed the full text of a random sample comprising 10% of records not presented during screening by ASReview. MC and TA independently verified half of this sample each. No eligible studies were identified, providing additional assurance that the stopping criteria had not resulted in the omission of relevant records.

## Data extraction

KM extracted ‘project descriptives’ (i.e. project name (if applicable), publication year(s), author(s), country of origin, methodological approach and the study setting or context of the included articles) pertaining to the project information included in the study. Two authors (KM and RW) independently extracted information relating to stakeholder roles from each included article using the standardised co-creation roles framework extraction template, including the predefined framework elements (Appendix E). Following independent extractions, decisions on extracted information were compared and any discrepancies in interpretation or classification were resolved through discussion until consensus was reached.

In the context of this study, ‘roles’ refer to the specific functions and responsibilities assigned to stakeholders engaged at any stage of the co-creation research process and at varying levels of engagement, thereby clarifying the *who*, *what*, *how* and *when* of their engagement. It is worth noting that we extracted information regarding the *who*, *what*, *how* and *when* specifically in relation to youth stakeholders.

In addition to extracting the predefined elements of the co-creation roles framework, information regarding research stage, engagement platform and knowledge utilisation stage, where extracted. Where study reports did not provide sufficient detail to support information extraction within a particular framework element, this was recorded as not reported rather than inferred by the reviewers. For other stakeholder groups, we focused solely on the *who* and *what* as our primary emphasis was on youth as the key stakeholders in the projects.

As the framework was developed independently of this review, we remained open to identifying additional elements

of stakeholder roles, potentially refining the framework and providing further insight. This approach also highlights areas for improved reporting and guides future research in the field.

## Results

### Co-creation roles framework

The Google Images search identified  $n=9$  potential visual outputs; however, none contributed conceptual elements relevant to the development of the co-creation roles framework. These outputs primarily presented descriptive summaries of co-creation activities or stakeholder groups, without operationalising stakeholder roles. The Google Scholar search identified  $n=30$  potentially relevant articles, of which  $n=5$  articles were included. These articles informed the development of the co-creation roles framework. Table 1 summarises the included articles and their respective contributions to the elements of the framework.

The co-creation roles framework comprises two complementary groups of descriptive elements. The first captures project-level characteristics that provide contextual information about the co-creation process (e.g. research stage, form of co-creation and stage of research knowledge utilisation). The second captures stakeholder role characteristics that describe how individual stakeholder groups participated in the research (e.g. stakeholder type, co-creation motive, engagement level, engagement platform and duration of engagement).

See Appendix B for preliminary results from Google Images and Appendix C for those from Google Scholar informing the co-creation roles framework. Appendix D

**Table 1** Included references to inform the co-creation roles framework identified from Google Scholar searches

What does it provide?

*Project aim.* E.g. Design a new cancer centre based on patients’ needs (Lee et al. 2018)

*Co-creation research stages.* E.g. Four stages: Planning (what is the purpose of the co-creation; and who should be involved?) OR Conducting (what activities can be used during co-creation; and how to ensure buy-in and commitment?) OR Evaluating (how do we know the process and the outcome are valid and effective?) OR Reporting (how to report the findings?) (Leask et al., 2019)

*Target group/stakeholder type/contributing actors/engaging actor.* E.g. Citizens, hospital staff, patients, architects, NGO’s OR Focal firm, customer, supplier, partner, competitor, influencer (Frow et al. 2015)

*Aim of their involvement/co-creation motive.* E.g. Access to resources, enhance customer experience, create customer commitment, enable self-service, create more competitive offerings, decrease cost, faster time to market, emergent strategy, build brand awareness (Frow et al. 2015)

*Co-creation form.* E.g. Co-conception of ideas, co-design, co-production, co-promotion, co-pricing, co-distribution, co-consumption, co-maintenance, co-outsourcing, co-disposal, co-experience, co-meaning creation (Frow et al. 2015)

*Engagement platform.* E.g. Digital application, tool or product, physical resources, spaces/events, joint processes and personnel groups (Frow et al. 2015)

*Duration of engagement.* E.g. One-off, recurring, continuous (Frow et al. 2015)

*Stage(s) of utilisation of research knowledge.* E.g. cognition, transmission/communication, social learning, reference, empowerment, influence, building trust, application/replication, effort, redefining issues (Jacobi et al. 2022)

*Level of engagement.* E.g. Inform, consult, involve, collaborate and empower (increasing stakeholder influence on the research from inform to empower) (Bammer 2019)

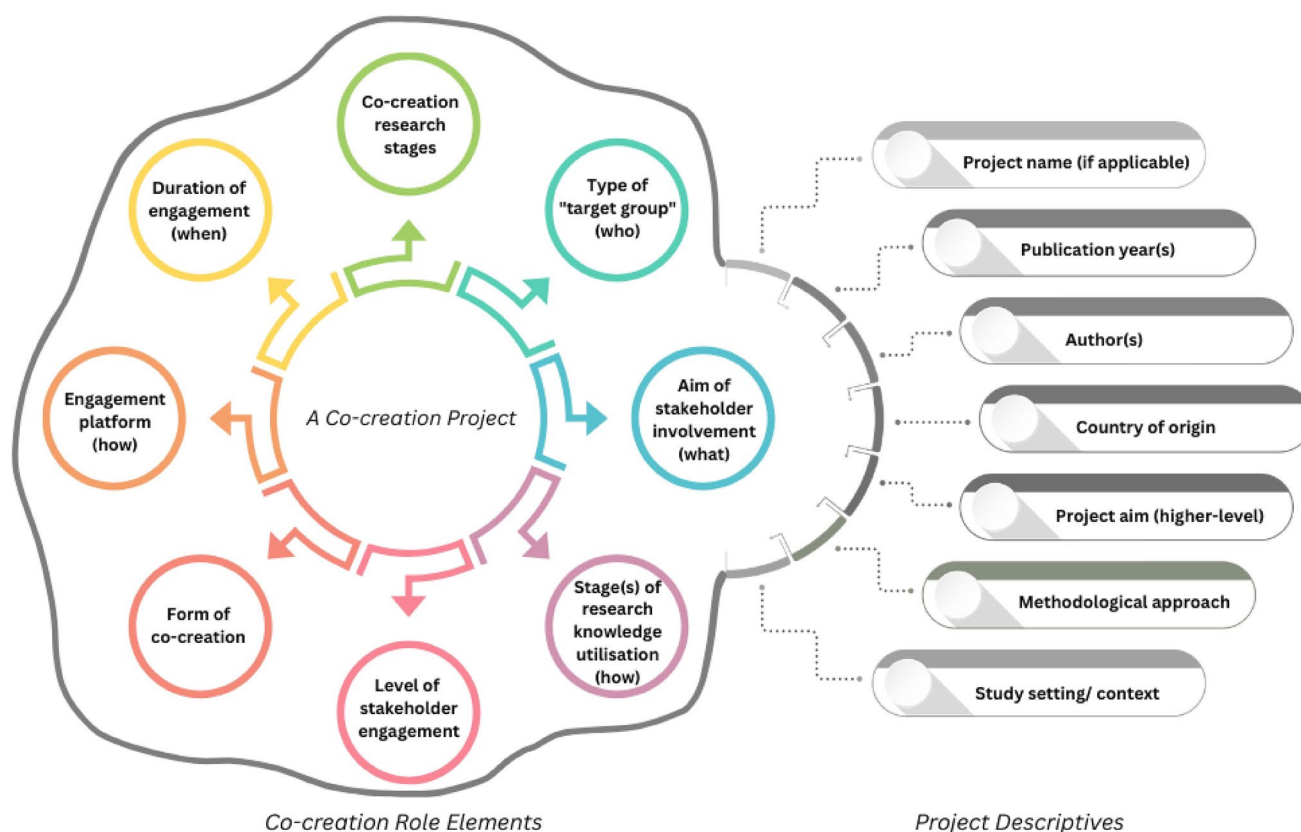


shows the framework's evolution via preliminary prototypes, while Appendix E presents the final co-creation roles framework template in tabulated form detailing elements such as stakeholder engagement levels. Appendix F provides a glossary to clarify terminology used within the framework.

The co-creation roles framework (Fig. 1) illustrates an operational classification framework encompassing elements describing stakeholder roles across co-creation research, including the co-creation research stage(s), the type of target group (i.e. stakeholder), the aim of their 'involvement' (i.e. co-creation motive), the stage(s) of research knowledge utilisation, the form of co-creation, the engagement platform, the level of engagement and the duration of engagement. The terms 'involvement' and 'engagement' are retained from the original source frameworks from which these concepts were synthesised. Specifically, involvement is used in relation to the co-creation motive (i.e. the aim of stakeholders' involvement), whereas engagement is used in relation to the engagement platform, level of engagement and duration of engagement. Note that, in line with the original source frameworks, the term *empower* appears in both the stakeholder engagement level and research knowledge utilisation elements. In the former, it refers to stakeholders' decision-making

authority during the co-creation process, whereas in the latter it refers to empowerment as an intended outcome of research knowledge utilisation.

In addition to core descriptors, we extracted project details—name, publication year, authors, country, aim, methodology and study setting—to provide context for stakeholder roles and support use of the framework as an extraction tool in systematic reviews. Each element of the co-creation roles framework was chosen to elucidate stakeholder role dynamics: research stage(s) show *when* contributions occur; target group (*who*) highlights role differentiation; involvement aim (*what*) reflects intended function; knowledge utilisation stage(s) (*how*) link input to impact; engagement level indicates decision-making power; co-creation form and platform (*how*) reveal interaction structure; and duration (*when*) informs continuity. Research stages and engagement levels are overarching elements shaping all other co-creation role elements, while project descriptors situate roles within methodological, geographic and institutional contexts. The project aim was presented under descriptors rather than within the framework, as it pertains to context rather than specific stakeholder roles.



**Fig. 1** Visual display of the co-creation roles framework consisting of co-creation role elements and project descriptives

## Systematic review findings

Figure 2 shows the PRISMA flow diagram presenting the screening process. The search yielded  $n = 8343$  unique records from which ASReview proposed  $n = 1854$  articles before the stop rule applied. Thirty-nine articles—describing  $n = 19$  different projects—met our inclusion criteria and were included in this systematic review. Results with respect to the co-creation roles are presented at the project level. Using the co-creation roles framework facilitated the

extraction of data relevant to describing stakeholders' roles in co-creation, demonstrating its practical utility for systematic reviews and future research.

## Summary of projects included

Table 2 shows descriptive information of the included projects. Since many projects were represented by multiple articles, these articles were consolidated at the project level. The projects described in the included articles were conducted

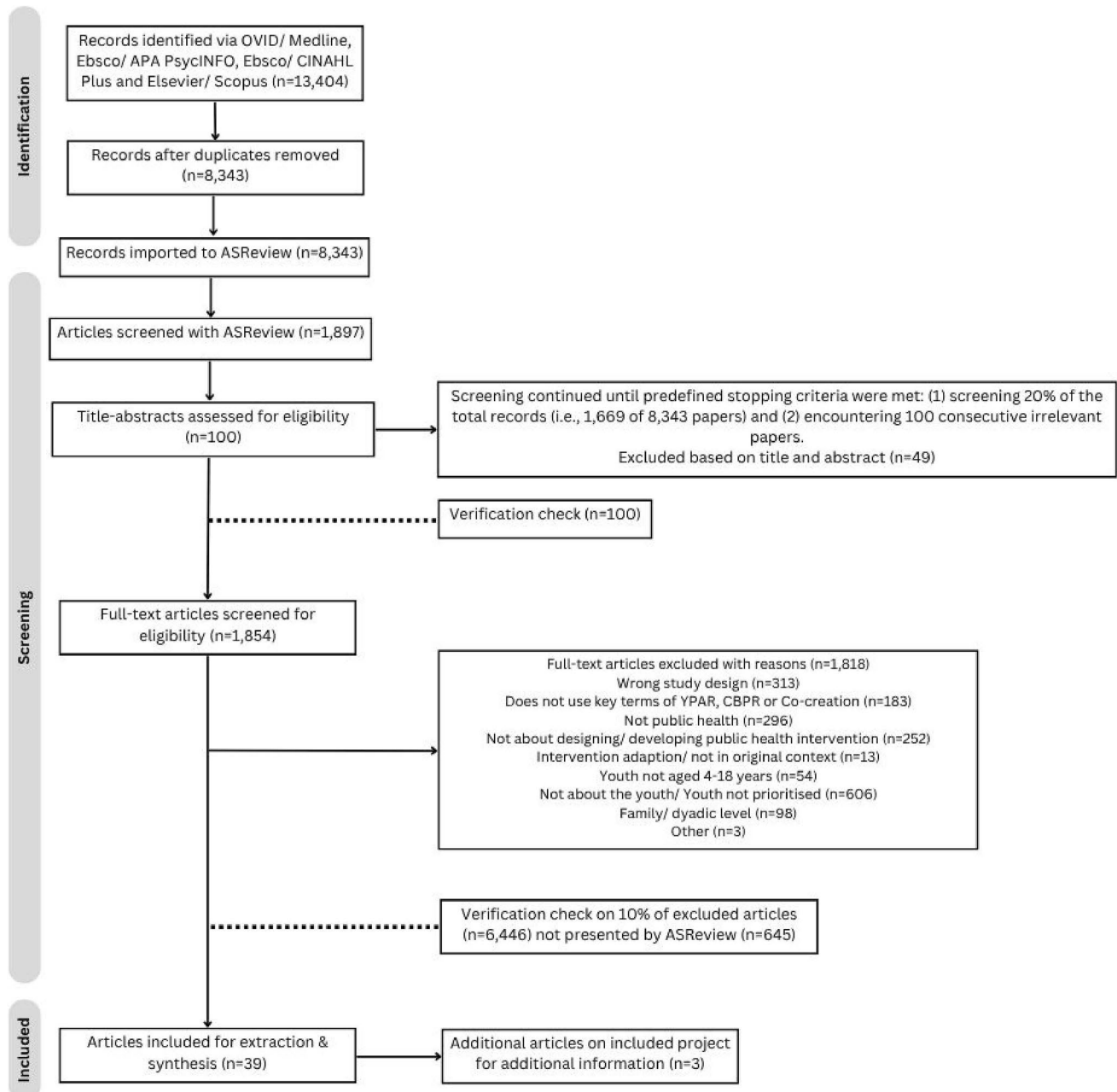


Fig. 2 The PRISMA flow diagram

**Table 2** Project descriptives of included articles

| Project ID | Project name (if applicable)                                         | Publication year(s)  | Author(s)                       | Country of origin                                  | Project aim (higher-level)                                                                                                                                                                                                                                                                            | Methodological approach                     | Study setting/context                      |
|------------|----------------------------------------------------------------------|----------------------|---------------------------------|----------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------|--------------------------------------------|
| 1          | Kids In Action                                                       | 2018; 2019a,b; 2020; | Anselma et al.                  | Amsterdam, the Netherlands                         | To develop, implement and evaluate interventions that stimulate a healthy lifestyle to reduce health inequalities in children from a low socioeconomic status neighbourhood in collaboration with the children themselves                                                                             | Youth Participatory Action Research         | Disadvantaged neighbourhood                |
| 2          | Lifestyle Innovations Based on Youth Knowledge and Experience (LIKE) | 2020; 2024; 2025     | Emke et al.; Waterlander et al. | Amsterdam, the Netherlands                         | To prevent children in Amsterdam from becoming overweight, actions were developed and implemented (i.e. action programme)                                                                                                                                                                             | Youth-centred Participatory Action Research | Amsterdam East (underserved neighbourhood) |
| 3          | Thinking, Active and Participating Zwolle (MAPZ)                     | 2021                 | Wilderink et al.                | Zwolle, The Netherlands                            | To create a healthy neighbourhood environment and with that, encourage healthy dietary and physical activity behaviour in children living in low-socio-economic position neighbourhoods                                                                                                               | Participatory Action Research               | Low socio-economic position neighbourhoods |
| 4          | Youth-centred Participatory Action (YOPA)                            | 2024                 | Chinapaw et al.                 | Denmark, the Netherlands, Nigeria and South Africa | To optimally tailor, implement and evaluate social and physical environmental interventions using an evidence-informed co-creation approach, for structural improvement in the lifestyle of adolescents (aged 12–18 years) in urban vulnerable life situations in two European and two African cities | Youth-centred Participatory Action Approach | Diverse urban environments                 |

Table 2 (continued)

| Project ID | Project name (if applicable) | Publication year(s) | Author(s)              | Country of origin                                            | Project aim (higher-level)                                                                                                                                                                                                   | Methodological approach                | Study setting/context                                                                                                                                                                    |
|------------|------------------------------|---------------------|------------------------|--------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 5          | N/A                          | 2023                | Vandendriessche et al. | Belgium                                                      | To develop and plan the implementation and evaluation of interventions promoting healthy sleep in adolescents                                                                                                                | Participatory Action Research          | Secondary schools in East- and West-Flanders                                                                                                                                             |
| 6          | Foxfit                       | 2022                | Brons et al.           | The Netherlands                                              | To develop a technology-supported intervention that facilitates health care providers in promoting physical activity for children (aged 8 to 12 years) with asthma and to systematically describe this developmental process | Co-creation                            | Physical Activity in Children With Asthma in a healthcare community with a public health focus                                                                                           |
| 7          | Move Well Feel Good (MWFG)   | 2023                | Clifford et al.        | West Lancashire region, United Kingdom                       | To enact a co-creation process used to create the programme, which is a primary school intervention to improve children's mental health through development of motor competence and psychosocial skills                      | Co-creation                            | School-Based Motor Competence and Mental Health Intervention of northwest England                                                                                                        |
| 8          | N/A                          | 2016                | Livingood et al.       | Jacksonville-Duval County, Florida, United States of America | To use community-based participatory research to engage youth in a digital intervention to reduce adolescent obesity                                                                                                         | Community-based Participatory Research | Centred around a predominantly African American part of the city that experiences major obesity-related issues                                                                           |
| 9          | N/A                          | 2012                | Ford et al.            | Southwest Alaska, United States of America                   | To ensure community-based participatory research with youth to enact strategies focused on youth resilience and wellbeing                                                                                                    | Community-based Participatory Research | Emphasis on youth in circumpolar indigenous communities, who tend to experience a greater prevalence of health and mental health disparities in context of South-western Alaska Villages |



**Table 2** (continued)

| Project ID | Project name (if applicable) | Publication year(s) | Author(s)                                                     | Country of origin | Project aim (higher-level)                                                                                                                                                                                                           | Methodological approach               | Study setting/context                                                                                                                       |
|------------|------------------------------|---------------------|---------------------------------------------------------------|-------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|
| 10         | N/A                          | 2017                | Verloigne et al.                                              | Flanders, Belgium | To enact a co-creation process, including the evaluation of how girls experienced co-creation and evaluate the effect of the co-creation of the co-creation on physical activity, individual, sociocultural and school-based factors | Co-creation                           | Lower-educated adolescent girls                                                                                                             |
| 11         | N/A                          | 2019                | Corr et al.                                                   | Ireland, England  | To assess the feasibility of co-creating a physical activity programme with teenage girls using guidance from the behavioural change wheel                                                                                           | Co-creation                           | Poor activity level of adolescent girls recruited from a post-primary school                                                                |
| 12         | Move it, Move ID!            | 2023; 2024          | Maenhout et al.                                               | Flanders, Belgium | To implement a co-creation approach for developing an intervention to increase physical activity                                                                                                                                     | Co-creation                           | Adolescents with mild to moderate intellectual disabilities within school setting                                                           |
| 13         | N/A                          | 2017a,b; 2021       | Hendricks and Wood; Wood and Hendricks; Mathikithela and Wood | South Africa      | To design, implement and evaluate prevention strategies to make healthy decisions about sexual behaviour (related to prevention of teenage pregnancy)                                                                                | (Youth) Participatory Action Research | Schools                                                                                                                                     |
| 14         | Sleep Solved                 | 2024                | Bennett et al.                                                | United Kingdom    | To design a highly accessible app suitable for adolescents with lower literacy levels that did not require extensive engagement for users to benefit from sleep hygiene advice and support                                           | Co-creation                           | App development involving youth people to support their sleep and mental health contextualised to Patient and Public Involvement activities |

Table 2 (continued)

| Project ID | Project name (if applicable) | Publication year(s)                          | Author(s)                                                                                                                                                                                                                                           | Country of origin                                                   | Project aim (higher-level)                                                                                                                                                                                                                                    | Methodological approach               | Study setting/context                                                                                                                                                                 |
|------------|------------------------------|----------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 15         | CO-CREATE                    | 2021;<br>2022a,b,c,d,e,f;<br>2023a,b,c,d,e,f | Banik et al.;<br>Bröer et al.;<br>Savona et al.;<br>Budin-Ljørsne et al.;<br>Knai et al.;<br>Savona et al.;<br>Grewal et al.;<br>Conway-Moore et al.;<br>Nesrallah et al.;<br>Klepp et al.;<br>Romanenko et al.;<br>Herstad et al.;<br>Ulloa et al. | The Netherlands,<br>Norway, Poland, Portugal and the United Kingdom | To reduce childhood obesity and associated co-morbidities in Europe and the rest of the world                                                                                                                                                                 | Co-creation                           | To work with young people to create, inform and disseminate evidence-based policies that help prevent obesity – this is across different community settings within the European Union |
| 16         | N/A                          | 2020                                         | Enriquez and Oliver                                                                                                                                                                                                                                 | Southwest borderland of the United States of America                | To implement a student-centered pedagogy such as the Student-Centered Inquiry as Curriculum approach to co-create an after-school sports club                                                                                                                 | Co-creation                           | Youth (i.e. middle school students) from a local independent public school/charter school                                                                                             |
| 17         | N/A                          | 2021                                         | Dadaczynski et al.                                                                                                                                                                                                                                  | Germany                                                             | To develop a game-based intervention aiming to promote navigation health literacy at the intersection of schools and communities                                                                                                                              | Co-creation (via Living Lab Approach) | Concerns about health literacy for a substantial proportion of children and adolescents                                                                                               |
| 18         | Teenovate                    | 2023                                         | Chatlani et al.                                                                                                                                                                                                                                     | Florida, United States of America                                   | To give teens a voice as the central authority on their own online safety experiences, by working together with teens to design and develop new online safety solutions which appeal to their specific developmental needs and unique online risk experiences | Youth Participatory Action Research   | To move towards teen-centric and justice-centred online safety solutions (about creating technologies that meet their developmental needs)                                            |

**Table 2** (continued)

| Project ID | Project name (if applicable) | Publication year(s) | Author(s)              | Country of origin                  | Project aim (higher-level)                                                                                                  | Methodological approach                | Study setting/context                                                     |
|------------|------------------------------|---------------------|------------------------|------------------------------------|-----------------------------------------------------------------------------------------------------------------------------|----------------------------------------|---------------------------------------------------------------------------|
| 19         | Albert's Leaders of Tomorrow | 2015                | Lolacono Merves et al. | New York, United States of America | To prevent and reduce mental health and other health disparities among Latino and black non-Latino adolescents in the Bronx | Community-based Participatory Research | Health disparities in a low-income urban community in the college setting |

across a range of geographic locations. Most projects were conducted in the Netherlands ( $n=4$ ; ID1, 2, 3, 6) or the United States ( $n=5$ ; ID8, 9, 16, 18, 19), followed by Belgium ( $n=3$ ; ID5, 10, 11, 12) and the United Kingdom ( $n=2$ ; ID7, 14). One project was conducted in Germany, one in South Africa, one across Denmark, the Netherlands, Nigeria and South Africa and one across the Netherlands, Norway, Poland, Portugal and the United Kingdom.

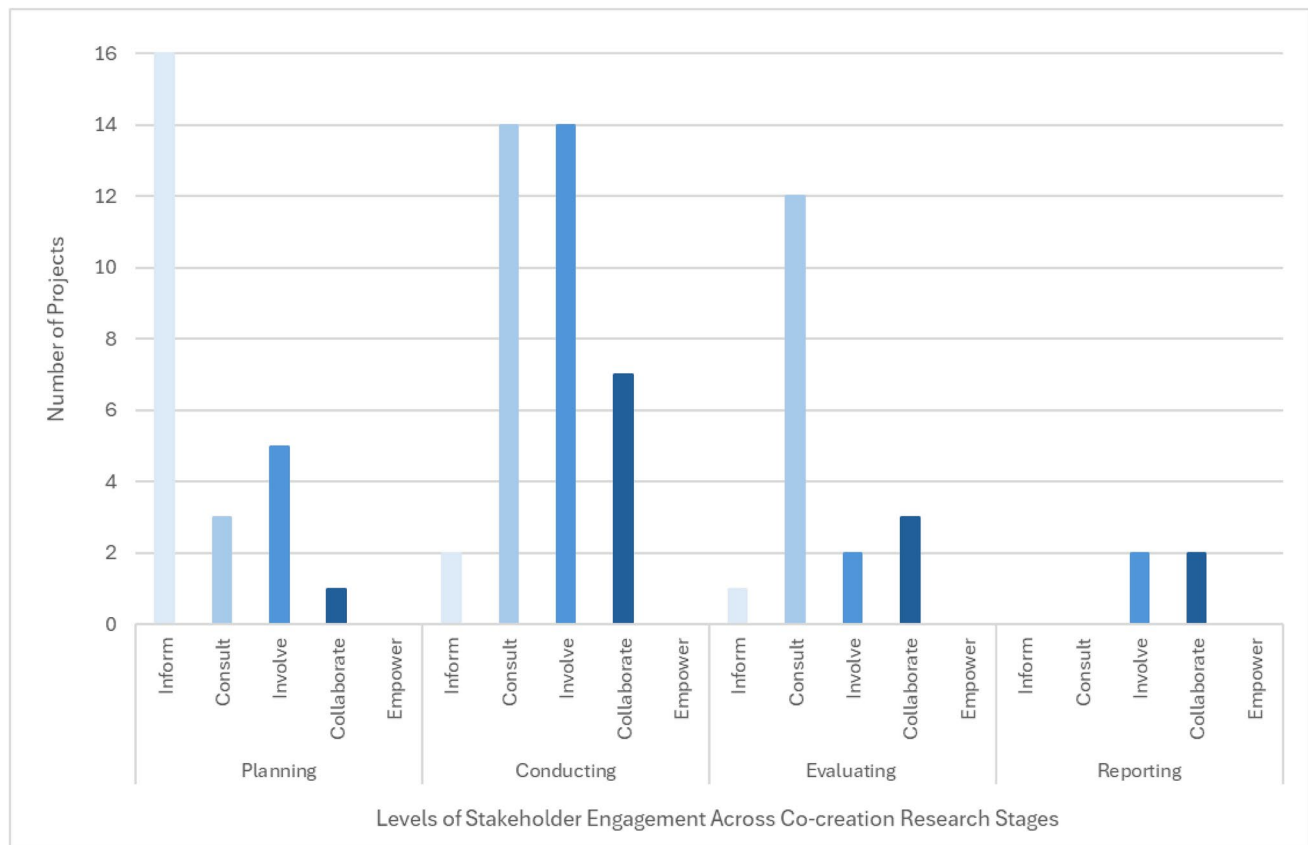
Most included projects aimed to promote healthy lifestyles among children and adolescents, particularly in vulnerable communities ( $n=8$ ; ID1, 2, 3, 4, 5, 10, 13, 15), followed by projects addressing mental health, resilience and wellbeing ( $n=4$ ; ID7, 8, 18, 19). The remaining projects focused on other public health priorities, including sexual health and health literacy. Further to this, most projects employed a co-creation research approach ( $n=9$ ) (ID6, 7, 10, 11, 12, 14, 15, 16, 17). Other approaches include YPAR ( $n=7$ ) (ID1, 2, 3, 4, 13, 18) with CBPR ( $n=3$ ) being the least frequently adopted approach (ID8, 9, 19). Moreover, the vast majority of projects were conducted in targeted settings such as within school/college, community or urban settings (ID1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 15, 16, 17, 19). Other settings of projects are set within PPI<sup>1</sup> activities (ID14) and an online safety environment (ID18).

Information extracted from the included articles, using the co-creation roles framework, was compiled into a template, which can be found in Appendix G. The subsequent sections outline key descriptions of the stages of co-creation and levels of stakeholder engagement across the projects, including other elements contained within said framework.

Figure 3 presents the distribution of projects across co-creation stages and stakeholder engagement levels, showing that the planning stage was most frequently linked with the 'inform' level of engagement, while 'collaborate' was the least frequent. Notably, the 'empower' level of engagement was not represented across any of the projects. During the conducting stage, 'consult' and 'involve' were the most frequent, with 'inform' being least used. In the evaluation stage, 'consult' was most frequent, again with 'inform' being least. The reporting stage was the least represented overall, with 'involve' and 'collaborate' occurring equally across projects.

In the following sections, we present the extracted data regarding the elements of the co-creation roles framework.

<sup>1</sup> PPI stands for patient and public involvement in research with activities designed to engage patients, carers or members of the public in the research process.



**Fig. 3** Distribution of projects across the stages of co-creation and levels of stakeholder engagement

## Findings about co-creation roles across projects

### Planning

Many projects described their recruitment processes, including ethics and selection procedures, typically aligned with the ‘inform’ level of stakeholder engagement (ID1, 2, 3, 4, 5, 7, 8, 10, 11, 12, 13, 14, 15, 16, 18, 19). For example, recruitment is facilitated through information sheets, meetings and gift incentives (ID1) and leveraged through social media, flyers and stakeholder analysis (ID4) as well as via gatekeepers, email and telephone (ID8). At the ‘consult’ level, a project’s academic sought out advice from other stakeholders on selection of the intervention neighbourhood (ID1). At the ‘involve’ level, a project created partnerships to discuss running projects in the neighbourhood (ID1). There was also the formation of alliance groups to enable discussions (ID15), the establishment of a youth council for informing users of the intervention (ID17) and conducting preparatory sessions with the participating youth to gather insights before initiating peer research (ID2).

Additionally, this stage included aspects of the project development, such as creating a name and logo, which

helped to build trust among youth through regular meetings (ID3). ‘Empowerment’ level was not observed at this stage across any projects. In general, recruitment was rarely a one-off event (ID2, 3, 7). However, in many cases, the *when* of recruitment was not explicitly reported (ID4, 8, 9, 10, 11, 12, 13, 14, 15, 16). In co-creation, recruitment may need to be viewed as a continuous or a recurring process due to the extended nature of such projects and the potential for stakeholder drop-outs (ID1, 5, 18, 19). In a few cases, recruitment or any other considerations for planning were not reported on (ID6, 17).

In terms of the stages of knowledge utilisation, the *how* for recruitment procedures included ‘transmission/communication’ and ‘application/replication’. Regarding co-creation forms, planning aligned with co-conception of ideas and co-meaning creation. In some cases, co-design, co-maintenance and co-experience were also relevant. For example, ‘involve’ was seen for planning in the preparations of peer research (ID2). It was interpreted by KM and RW that recruitment and selection procedures alone did not justify a co-creation form, such as co-experience as these procedures were typically top-down in their execution.

## Conducting

‘Inform’ was the least frequent level of engagement linked with the conducting stage. Where it was present, it referred to a project that communicated the project aim to the co-creation group in a one-off meeting (ID10) and to another that provided stakeholders (i.e. youth and their parents) with information on how to conduct research through a series of recurring meetings (ID2). Regarding ‘consultation’ at this stage, many projects conducted a participatory needs assessment and identified ideas as well as preferences (e.g. related to intervention or app use) through methods such as interviews and focus groups (ID1, 3, 5, 6, 8, 11, 12). For example, the conducting stage involved determining key factors, such as barriers and facilitators, that influenced behaviour change (ID1, 3, 11, 12), yet this type of role could also be seen at the involve level, such as through the method of participant observations (ID2). For instance, in one project, youth were encouraged to generate data ideas in relation to the intervention development and to select methods (ID13). That said, it was not always clear how the development and/or implementation of intervention ideas were applied beyond meetings or workshops (ID2, 4, 6, 7, 10, 14). ‘Involve’ entailed roles such as verification of the data that was gathered in a participatory needs assessment as well as ensuring a gradual transfer of responsibilities where specific plans were made to continue to consult with identified champions related to the interventions and participatory process after the project ended (ID1). ‘Collaborate’ was concerned with the implementation of action ideas, set during recurring meetings (ID2) and children performing analysis and creating posters (ID3). Other instances of ‘collaboration’ at this stage entailed mapping the context together with adolescents in a project where interventions could be set up (ID4).

The ‘empowerment’ level was not observed at this stage across any projects. Regarding stages of knowledge utilisation, the following were identified for the *how*: ‘cognition’, ‘transmission/communication’, ‘social learning’, ‘empowerment’, ‘influence’, ‘application/replication’ and ‘effort’ across activities. Co-creation forms comprised co-conception of ideas, co-design, co-production, co-maintenance, co-experience and co-meaning creation.

## Evaluating

The evaluation stage focused on two different processes (ID10): (1) effect evaluation (i.e. of implemented interventions), which included pre- and post-measures where youth were invited to provide data related to the health issue, and (2) process evaluation (i.e. process of conducting PAR/co-creation/CBPR with stakeholders) (ID11), which involved reflections on the implementation of interventions and feelings of empowerment (ID1) to inform improvements

(ID2). On the level of ‘inform’ this was only observed in relation to one project about the invites given to stakeholders for the purpose of effect measurements via meetings on a recurring basis (ID1). ‘Consult’ was the most frequently observed level in regard to the stage of evaluation, for illustration, in evaluating at the project level, focus groups, informal chats and interviews were conducted to elicit relevant information from stakeholders (ID3). Feedback took the form of reflections on the co-creation process (ID7, 15, 18) and included tools such as satisfaction surveys with thumbs-up/thumbs-down statements (ID12). For ‘involve’, this was seen, for example, where one project performed an evaluation on the implemented actions for improvement of actions via preparing certain methods (e.g. surveys or interviews) to gauge satisfaction levels of those participating adolescents as well as developmental evaluation via sessions involving logbooks, notes and meetings with implementation partners (ID2). On the level of ‘collaborate’ for evaluation, this could only be traced to a projects’ outcome evaluation in terms of training of data collectors in four communities (ID4). Moreover, the ‘empowerment’ level was not observed at this stage across any projects.

Process evaluations were found to be formative, such as when components of interventions were created and piloted (ID6). Methods for the process evaluation included meetings to capture youth comments, issues, concerns and preferences (ID8). Additional (effect) evaluation methods involved systematic observations, existing databases, survey data (ID4), quasi-experimental designs (ID5) and was contextualised within living lab activities (ID17). However, evaluations were not consistently observed across all projects (ID9, 13, 14, 16, 19).

Knowledge utilisation stages of ‘cognition’, ‘social learning’, ‘building trust’, ‘application/replication’ and ‘effort’ were identified concerning the *how* in methods across activities. In regard to co-creation forms, the evaluation stage aligned with co-conception of ideas, co-design, co-production, co-maintenance, co-experience and co-meaning creation.

## Reporting

Only a small number of projects ( $n = 4$ ; ID2, 8, 13, 15) included a reporting stage beyond academic publication.

At the ‘involve’ level, reporting involved presenting peer research findings through poster presentations to raise awareness of project outcomes (ID2) and disseminating results via various channels, such as school-based communications and outreach to final-year students (ID13). At the ‘collaborate’ level, youth presented findings to a broader board during the project, which were subsequently shared with organisational stakeholders to enhance the

intervention's relevance (ID8). In one project, 'collaboration' extended to an engaged dissemination strategy in which youth played a central role in producing outputs, including a toolkit for wider use, a dialogue forum tool and a summary report (ID15). No additional reporting activities were identified at other levels of stakeholder engagement, meaning the 'inform', 'consult' and 'empower' levels.

Knowledge utilisation stages that identified around 'influence', 'building trust', 'application/replication', 'effort' and 'redefinition' related to the *how* in methods across activities. For co-creation forms, this stage was congruent with the co-conception of ideas, co-design, co-maintenance, co-experience and co-meaning creation.

## Discussion

This study developed an operational classification framework for stakeholder roles in co-creation research to enhance transparency in project reporting and support the extraction of key role characteristics in systematic reviews. It addresses the lack of clear definitions and reporting frameworks for stakeholder roles in co-creation research (Halvorsrud et al. 2021).

A central element of our framework is the identification of stages within the co-creation process. As co-creation can span any or all research stages (Vargas et al. 2022; Messiha 2021; Messiha et al. 2023), examining stakeholder roles across stages is salient. While consensus on the optimal timing of stakeholder engagement is lacking (Frow et al. 2015), early involvement is recommended, as it shapes the nature and level of roles assumed (Longworth et al. 2024a). It ought to be advocated for that co-creation is supported by early and sustained engagement and clear role definitions (Longworth et al. 2024b), aligning with our framework. This approach may also mitigate poor transparency, communication and engagement, which can render research extractive or exploitative (Agnello et al. 2025).

Our findings reveal limited reporting of stakeholder roles, especially during planning and insufficient detail in evaluations to assess engagement, despite using surveys, feedback meetings, pilot testing and quasi-experimental designs. Dissemination beyond academic publications was rare, with few projects involving stakeholders in presentations, toolkits or dialogues, highlighting the need for dedicated time, resources and collaboration—for example, by engaging stakeholders directly in sharing results with their communities or networks (Monnard et al. 2021). Some projects used co-creator feedback forms to systematically collect data on co-creation processes, which has been shown to improve understanding and management of these processes in co-creation projects (cf. Vogelsang et al. 2025; Emke et al. 2024).

Overall, our findings demonstrate the potential value of the co-creation roles framework as a practical tool for planning, reporting and appraising stakeholder engagement in co-creation research. By providing a common structure for describing stakeholder roles, engagement levels and research stages, the framework supports researchers in prospectively defining and consistently reporting stakeholder roles, while facilitating comparisons across studies. It may also assist funders, ethics committees and journals in evaluating the planned and reported stakeholder roles within funding applications, ethics submissions and reporting guidance—and enable systematic reviewers to consistently extract and compare stakeholder role elements across studies.

Using the co-creation roles framework, we found that no projects reached the highest engagement level—'empowerment'—with most limited to 'consultation' and some including 'collaboration'. The original IAP2 framework defines empowerment as transferring final decision-making authority, whereas the adapted version frames it as researchers supporting stakeholders to conduct their own research, which would classify 13 of 19 projects as 'empowered'. This highlights the challenge of operationalising empowerment: when empowerment is defined narrowly, limited co-creation initiatives demonstrate genuine stakeholder decision-making authority, whereas broader definitions risk overstating stakeholder influence.

Beyond definitional differences, striving for empowerment can be constrained by a range of barriers. At the individual level, stakeholders may lack the time, skills or resources to engage meaningfully in research projects. At the process level, there may be unclear pathways for moving from consultation to genuine empowerment. At the structural level, sustaining stakeholders in active, decision-making roles over time can be complicated, for instance, due to power dynamics and/or time commitments. Collectively, these barriers limit the extent to which stakeholders can exercise real influence in research, highlighting the gap between the theoretical promise of empowerment and its actual realisation.

Finally, although the co-creation roles framework provides a structured approach to describing stakeholder roles across the research process, further research is needed to evaluate its application across diverse co-creation contexts and to determine how well it captures changes in stakeholder roles over time. The co-creation roles framework provides an operational approach to describing stakeholder roles based on existing concepts and frameworks. Future research should externally validate the framework through planning and reporting of co-creation research across diverse contexts and evaluate its practical application. We recommend the framework as a practical tool for describing stakeholder roles in co-creation projects and systematic reviews, with explicit reporting of research stages, engagement levels, timing and



knowledge utilisation to enhance transparency, consistency and comparability.

## Limitations and strengths

A limitation of this study is that only the lead author (KM) screened images and articles, potentially introducing reviewer bias. Furthermore, the search in Google images and Google scholar undertaken to inform the operational classification framework development may be less readily reproducible than a systematic literature search, as framework development necessarily involved the synthesis of conceptual elements across diverse sources. Furthermore, by employing machine learning to prioritise records for screening, ASReview carries a risk of not including eligible studies. Verification procedures were undertaken to reduce this risk, however, the possibility of misclassification or the omission of eligible studies cannot be completely excluded. We also did not undertake a formal quality appraisal of the included studies, as the review was intended to demonstrate the application of the co-creation roles framework rather than evaluate intervention effectiveness or study quality. In addition, because the framework was applied to published studies, the findings may be influenced by publication and reporting bias, with projects providing more comprehensive descriptions of stakeholder engagement being more likely to contribute richer role information. Data extraction on co-creation stages and stakeholder engagement may have blurred distinctions—e.g. between conducting and evaluating or consulting and involving—but this was mitigated by independent extraction by two researchers. The stricter definition of ‘empowerment’ in the original IAP2 framework compared with the adapted version may also have influenced interpretation. Another limitation of this study is that the framework was developed without the direct engagement of non-academic stakeholders. Although the framework draws on extensive literature across multiple fields, the absence of stakeholder co-development may limit its sensitivity to experiential perspectives and contextual nuances in how roles are understood and enacted in practice.

A key strength of this work lies in the development of an operational classification co-creation roles framework that is not constrained by research field, offering a systematic and versatile approach to reporting stakeholder roles in co-creation processes. The framework template’s utility as an extraction tool was demonstrated, highlighting its practical applicability and potential for future research.

## Conclusion

This study proposes an operational classification framework for co-creation roles taken up by stakeholders in co-creation research, accompanied by explicit role definitions and

a structured template intended to enhance transparency and comparability across studies. By integrating research stages, levels of stakeholder engagement and other key elements, the framework offers a means to reporting and comparison of how stakeholder roles are configured and enacted within co-creation research processes. The framework has potential utility as a methodological resource for synthesising co-creation roles across its research stages from planning to reporting. However, these findings should be interpreted in light of the methodological limitations, including the absence of formal framework validation, the nature of the search, the lack of formal quality appraisal of included studies and the influence of publication and reporting biases. Future research should externally validate the framework to evaluate its usability across diverse co-creation contexts and examine its contribution to improving the planning, reporting and synthesis of co-creation research.

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**Authors’ contributions** KM conceptualised, gave oversight and made decisions for the article, as well as participated in all stages of the study process including the search strategies, screening, performing the extraction and analysis and drafted all sections of the manuscript. MC provided critical input in the conceptualisation of the review, contributed to the decision-making process, quality check of the screening process and the manuscript writing. JK executed the search strategy for the systematic review and gave input in the manuscript. RW performed the data extraction and analysis of the included articles/projects as well as gave input in the manuscript. TA provided critical input in the conceptualisation of the review, contributed to the decision-making process, quality check of the screening process and the manuscript writing.

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## Declaration

**Competing interests** The authors have no competing interests to declare that are relevant to the content of this article.

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