

REVIEW

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Young people's participation experiences of technical and vocational education and training interventions in low- and middle-income countries: a systematic review of qualitative evidence

Yi Shi^{1*}  and Mukdarut Bangpan²

*Correspondence:
yi.shi.19@ucl.ac.uk

¹ Education, Practice and Society,
Institute of Education, University
College London, 20 Bedford Way,
London WC1H 0AL, UK

² EPPI-Centre, UCL Social
Research Institute, Institute
of Education, University College
London, 27 Woburn Square,
London WC1H 0AA, UK

Abstract

Technical and vocational education and training (TVET) has attracted wide attention with its potential to alleviate poverty and improve youth employment in low- and middle-income countries (LMICs). However, no agreement has been reached on its impact on participants' wellbeing and livelihoods. Most previous reviews were restricted to economic and employment-related outcomes through statistical meta-analyses and failed to examine participants' comprehensive experiences. This systematic review investigated young people's learning process and consequences of TVET participation in LMICs by reviewing qualitative evidence across 31 published and unpublished studies from 2000 to 2019. Adopting a framework thematic synthesis approach, this study revealed that TVET participation had a multi-dimensional impact on young people's cultural capital (skills and knowledge, credentials and socio-emotional competencies), social capital (bonding, bridging and linking social relationships), aspirations, and health, beyond economic consequences. Participants' mixed experiences were collectively shaped by multiple factors, including intervention features, intervention quality (curriculum and content, instructor and instruction, administration and management), learning environment (physical environment, instructor-learner relationship and peer relationship), individual characteristics, and social norms. Findings also indicated that disadvantaged youth particularly benefitted from TVET participation, which highlighted the potential of TVET to improve education access and equity. A framework was distilled from evidence synthesis to inform future research and practice that aim to design, implement and evaluate TVET in a way to enhance young people's overall wellbeing in the developing context.

Keywords: Technical and vocational education and training, Youth, Developing country, Experience, Systematic review, Qualitative study

Introduction

Oriented towards employment and work, technical and vocational education and training (TVET) has gained increasing attention and commitment from international and national bodies for its role in poverty alleviation. However, its impact on personal wellbeing and national development is still under debate. Proponents recognize the role of TVET in preparing students for specific jobs and enhancing their productivity and employability (Brunello and Giannini 2004; Min and Tsang 1990). TVET can thus reduce structural unemployment and supply labor market with skilled workers, as the engine of economic development and international competitiveness (Azzoni and Arbizu 2013; Paryono 2017; United Nations Educational, Scientific and Cultural Organization [UNESCO] 2012). A human-centered paradigm also applauds the contribution of TVET to widening access to education and work for the masses, especially the marginalized and underrepresented groups, and thus helping develop an inclusive and tolerant society (Wheelahan and Moodie 2016).

Opponents question the ability of TVET to supply competent students and address the rising unemployment issues (Foster 1965; Krueger and Kumar 2004). Some long-standing challenges of TVET include underinvestment, poorly designed curriculum, and low status among the public (Oketch et al. 2009). In addition, the number of middle-skilled jobs in many developing countries that TVET traditionally prepared individuals for has declined rapidly due to technological advancements and economic restructuring (Wheelahan and Moodie 2016; World Bank 2016). Many TVET graduates hence found themselves hard to compete in an upskilled job market with outdated skills. Other opponents argue that TVET has a lower labor market return than general education with its high cost of personnel training and equipment (Psacharopoulos 1991; Ryan 2002; Stromback 2010; Tsang 1999).

Regardless of the debate, TVET is bound to play a bigger role in the economic participation and wellbeing of people, especially young people, in developing countries. As the number of young populations completing primary education has and will continue to increase the demand for secondary and tertiary education including TVET (Marope et al. 2015), priorities in low- and middle-income countries (LMICs) are shifting from providing basic education to equipping population with relevant skills and competences (Tikly 2013). It is therefore critical to examine what TVET can and cannot achieve and optimize its potential based on the lessons learned.

Over the past decades, an increasing number of primary research studies have been conducted to reveal the impact of TVET interventions on young people's life in the developing context, ranging from rigorous impact evaluation studies to qualitative studies on participants' views and experiences. Several statistical meta-analyses attempted to synthesize the quantitative evidence (Betcherman et al. 2007; Eichhorst and Rinne 2015; Independent Evaluation Group 2012; Abdul Latif Jameel Poverty Action Lab 2013; Kluve et al. 2017; Tripney and Hombrados 2013). Kluve et al. (2017) reviewed relevant experimental and quasi-experimental studies and distilled global evidence of the impact of active labor market programs on youth participants' employment, earning and business performance outcomes. Tripney and Hombrados (2013), more specifically, synthesized quantitative data on the impact of TVET interventions on young people's overall paid employment, formal employment, earnings, self-employment earnings and

weekly hours worked in LMICs. The majority of existing reviews, adopting a quantitative approach, narrowly focused on economic and employment-related outcomes and failed to investigate the comprehensive impact of TVET on youth participants' wellbeing. For example, they may conclude youth's increasing working hours as an indicator for intervention effectiveness, but fail to factor in possible harm, such as youth's physical fatigue and mental stress due to overwork. They also downplayed the importance of context and individual experiences in understanding intervention impacts.

Review questions

To address the limitations of quantitative reviews, this study aimed to understand the comprehensive impact of TVET on youth participants by synthesizing qualitative evidence of their participation experiences in LMICs. With an emphasis on contextualized individual experiences and perspectives, qualitative reviews can generate new and nuanced knowledge and uncover diversity in evidence that are not fully captured in statistical analysis (Gough 2015). The review answered two questions:

1. What are young people's learning experiences during their TVET participation?
2. What are their consequences of TVET participation in terms of their wellbeing and personal development?

Definitions

This review adopted the definition of TVET as "comprising education, training and skills development relating to a wide range of occupational fields, production, services and livelihoods" (UNESCO 2015, p. 2). *TVET interventions* were defined as activities of a project, program or any other type of action in the field of TVET. Specifically, the review focused on TVET interventions related to trades and jobs that require relatively low skills, including, but not limited to, construction, tailoring, and automobile repairing, as opposed to preparations for "high skills" professions, such as nurse and teacher (Green et al. 2009, p. 2069). The latter, usually offered in general universities and specialized institutions for professional-level vocational preparation, has some fundamental differences from the former in terms of quality and intensity, and hence deserves to be investigated separately from this review.

Since there is no universally accepted classification of TVET types, this review borrowed and adapted the categorization of TVET interventions in Tripney et al. (2013). Four general types of TVET are defined as follows:

- *Technical education* refers to theoretical vocational preparation of students for jobs involving applied science and modern technology and classified above the skilled crafts but below the scientific or engineering professions.
- *Vocational education and training* are traditionally non-theoretical organized activities to prepare students for jobs in designated trades or occupations with a focus on the actual attainment of proficiency in manual skills.
- *On-the-job training* is "workplace-based training that uses real jobs as a basis for instruction and for practical purposes" (p. 16).

- *Apprenticeship training* refers to training that combines on-the-job training for a highly skilled craft or trade with academic or theoretical instruction, ranging from informal work-based learning-by-doing to formal structured programs sponsored by large industrial firms.

Methods

The present review adhered to the Preferred Reporting Items for Systematic Reviews and MetaAnalyses (PRISMA) guidance (Moher et al. 2009). Before conducting the review, a protocol was developed and registered in the International Prospective Register of Systematic Reviews (PROSPERO; reference number: CRD42020199263).

Eligibility criteria

This review focused on studies that reported qualitative evidence of young people's experiences of participating in TVET in LMICs. The studies were selected based on the following inclusion criteria:

- Eligible publications were located in LMICs as classified by the World Bank in 2019.
- Publications were included if they focused on TVET interventions that were consistent with the given definitions in “Definitions” section, regardless of levels or settings. Interventions can be stand-alone or be part of a larger program. The review excluded vocational education for high skills professions in the sectors of healthcare (such as nursing) and education (such as teacher education).
- Publications were included if the majority of their research subjects were young female and male participants aged 15 to 35. In the case where the age of subjects was not specified, publications were included if they claimed to target at youth population.
- The review only included publications with a substantial qualitative data analysis on young people's experiences. The study design can be qualitative or mixed methods where the qualitative components comprised a substantial feature of the study and contributed substantively to the findings. Only qualitative components of mixed-methods studies were included for data extraction and synthesis.
- Publications were only included if they reported sufficient qualitative data collected from youth participants, as the review intended to give voice to participants and understand their subjective experiences.
- Eligible studies were published in English from 2000 to 2019.
- Eligible studies included peer-reviewed journal articles, dissertations and theses and other grey literature.

Search strategy

A systematic and comprehensive search was conducted to locate both published and unpublished studies. Firstly, 10 major bibliographic databases (including Applied Social Sciences Index and Abstracts, Education Resources Information Centre, SCOPUS, and Social Sciences Citation Index) were electronically searched for

peer-reviewed journal articles. Search strings were developed for four key concepts: TVET, youth, study design, and LMICs (see [Appendix 1](#)). Secondly, 19 specialist databases and library catalogs (including Campbell Collaboration Library, DAC Evaluation Resource Center, EPPI-Centre Library, and International Youth Foundation Library) were hand searched. Thirdly, based on the list of organization websites in Tripney and Hombrados (2013), 19 websites of key governmental, non-governmental and multilateral development organizations and research centers were hand searched. Fourthly, dissertations and theses were searched in relevant databases. Lastly, an informal search using snowballing techniques was conducted as a supplement to check the bibliographies of included studies and relevant reviews.

At the first stage, the first author screened titles and abstracts of all publications identified by the search strategy against the inclusion criteria. At the second stage, full texts of included and undetermined studies were further screened against the same criteria. Studies included were then assessed for quality. Only high and medium quality studies were included for evidence synthesis. The second author independently and periodically checked the results. Any disagreements were resolved through discussions between the two reviewers. EPPI-Reviewer 4 software (Thomas et al. 2010) was used to document and manage the whole review process.

Data extraction and quality appraisal

Specifically designed coding tools were used to extract data from each publication on study settings, intervention characteristics, study methodology, and reported evidence of young people's experiences. Publications were quality assessed using a tool developed by the EPPI Centre (Bangpan et al. 2017). This tool was solely constructed for the synthesis of primary qualitative evidence, which offered the flexibility to evaluate reliability and usefulness of primary qualitative evidence across different methodologies (see [Appendix 2](#)). The first author mainly undertook the data extraction and quality appraisal, while the second author was consulted and checked the results periodically and independently.

Methods of synthesis

This review adopted the framework thematic synthesis approach (Booth et al. 2012) to analyze and synthesize qualitative evidence of young people's experiences. Framework synthesis presents data using a tentative priori framework of themes and concepts that is subject to change as new concepts and themes emerge from data analysis (Gough et al. 2012). The review followed five stages (Pope et al. 2000):

- Familiarization. The reviewers understood the scope of included literature through screening and a pilot review.
- Developing a thematic framework. As there was no readily available framework that conceptualized young people's comprehensive experiences of TVET participation, the reviewers developed a preliminary framework with broad domains of youth's experiences based on the pilot review and the reviewers' prior knowledge.

- Indexing. The reviewers coded the studies line by line with the thematic framework. As new domains emerged, the initial framework was revised accordingly. Themes under each domain of experiences were also identified.
- Charting. The reviewers undertook a thematic analysis by examining the similarities and variations among domains and themes and rearranging and regrouping data into higher-order categories in accordance with the review questions. Distilled summaries of evidence were then produced.
- Mapping and interpretation. Relevant themes were pulled out to answer the review questions. The reviewers mapped the range and nature of young people's experiences and found associations between themes as a way of developing explanations for the findings.

Results

Results of screening and quality appraisal

Of the 15,386 peer-reviewed journal articles, reports and doctoral dissertations identified from all sources, 413 publications were included for full text screening based on the title and abstract. Thirty-four publications meeting the eligibility criteria were further identified and subject to quality appraisal, the results of which were presented in Table 1. Thirty-one publications were included for evidence synthesis with 10 marked as high quality and 21 marked as medium quality. Three publications marked with low quality were excluded mainly due to the limited depth and breadth of their findings. The included publications represented the existing quality qualitative evidence that was most relevant to answer the review questions. The complete process of selection was detailed in Fig. 1.

Study description

The publications included for synthesis investigated 30 unique TVET interventions. Table 2 describes these publications in terms of settings, methodology, intervention characteristics, and domains of reported experiences. Geographically, over half of the studies were located in Africa, with 11 in Asia, two in South America, and three in Europe. A total of 17 countries were covered, including 12 middle-income countries and five low-income countries. Two-thirds of the studies employed qualitative study designs, while few adopted a mixed-methods approach. Most studies used purposive sampling methods to collect data from young people who had rich knowledge and experiences of TVET participation. The sample size of youth participants ranged from two (Nagamuthu et al. 2019) to 130 (Lefebvre et al. 2018). While several studies reported a majority of study participants between 15 and 35 years old, the rest did not specify the age range. Interviews were the mostly used data collection method. Most data were subject to thematic analysis or content analysis.

A wide range of TVET interventions were reported in terms of type, business sector, duration, format, provider, and target participant. Among the four TVET types, vocational education and training was prevalent in nearly all interventions. The majority of interventions (73%) contained a combination of several TVET types. While over half of the interventions consisted of technical activities only, 14 included non-technical

Table 1 Quality appraisal results

Studies	Reliability items			Usefulness items			Reliability rating Q7: Consider Q1-4	Usefulness rating Q8: Consider Q5-6	Overall quality Consider Q7 and Q8	Decision
	Q1: Were steps taken to strengthen rigor in the sampling?	Q2: Were steps taken to strengthen rigor in the data collected?	Q3: Were steps taken to strengthen the rigor of the analysis of data?	Q4: Were the findings of the study grounded in/supported by the data?	Q5: Rate the findings of the study in terms of their breadth and depth	Q6: Privileges participants' perspectives/experiences?				
1. Adhikari (2018)	Met	Met	Met	Met	High	Met	High	High	High	Inclusion
2. Alcid (2014)	Met	Met	Unmet	Unmet	Medium	Met	Medium	Medium	Medium	Inclusion
3. Apunda et al. (2017)	Met	Met	Unmet	Unmet	Medium	Unmet	Medium	Medium	Medium	Inclusion
4. Bhurte (2016)	Unmet	Met	Unmet	Met	Medium	Met	Medium	Medium	Medium	Inclusion
5. Botea et al. (2015)	Met	Met	Met	Met	Medium	Met	High	Medium	High	Inclusion
6. da Luz et al. (2012)	Unmet	Met	Met	Met	Medium	Met	Medium	Medium	Medium	Inclusion
7. Darkwah (2013)	Met	Met	Unmet	Unmet	Medium	Unmet	Medium	Medium	Medium	Inclusion
8. DeJaeghere (2018)	Unmet	Met	Unmet	Met	High	Unmet	Medium	Medium	Medium	Inclusion
9. DeJaeghere et al. 2019	Met	Met	Met	Met	Medium	Unmet	High	Medium	High	Inclusion
10. Donkor (2012)	Met	Met	Unmet	Met	Medium	Met	Medium	Medium	Medium	Inclusion
11. Hamilton et al. (2013)	Met	Met	Unmet	Unmet	Low	Met	Medium	Low	Low	Exclusion
12. Jacobs and Collair (2017)	Met	Met	Met	Met	High	Unmet	High	Medium	High	Inclusion
13. Koo (2016)	Met	Met	Unmet	Met	High	Met	Medium	High	High	Inclusion
14. Korzh (2013)	Met	Met	Unmet	Met	Medium	Unmet	Medium	Medium	Medium	Inclusion

Table 1 (continued)

Studies	Reliability items			Usefulness items			Reliability rating	Usefulness rating	Overall quality	Decision
	Q1: Were steps taken to strengthen rigor in the sampling?	Q2: Were steps taken to strengthen rigor in the data collected?	Q3: Were steps taken to strengthen the rigor of the analysis of data?	Q4: Were the findings of the study grounded in/supported by the data?	Q5: Rate the findings of the study in terms of their breadth and depth	Q6: Privileges participants' perspectives/experiences?				
15. Latopa and Rashid (2015)	Met	Met	Unmet	Unmet	Medium	Unmet	Medium	Medium	Medium	Inclusion
16. Lefebvre et al. (2018)	Unmet	Met	Unmet	Met	High	Unmet	Medium	Medium	Medium	Inclusion
17. Ling (2015)	Unmet	Met	Unmet	Met	High	Unmet	Medium	Medium	Medium	Inclusion
18. Makanya et al. (2014)	Met	Met	Met	Unmet	Low	Unmet	Medium	Low	Low	Exclusion
19. Management Systems International and A Tetra Tech Company (2017)	Unmet	Met	Met	Met	Medium	Unmet	Medium	Medium	Medium	Inclusion
20. Masinire (2015)	Met	Met	Unmet	Unmet	Low	Unmet	Medium	Low	Low	Exclusion
21. Matsumoto (2018)	Unmet	Met	Unmet	Met	Medium	Unmet	Medium	Medium	Medium	Inclusion
22. Murtaza et al. (2018)	Met	Met	Met	Met	Medium	Unmet	High	Medium	High	Inclusion
23. Nagamuthu et al. (2019)	Met	Met	Met	Unmet	Medium	Unmet	Medium	Medium	Medium	Inclusion
24. Neroorkar and Gopinath (2019)	Met	Met	Met	Met	Medium	Met	High	Medium	High	Inclusion
25. Powell (2012)	Met	Met	Unmet	Met	Medium	Met	Medium	Medium	Medium	Inclusion

Table 1 (continued)

Studies	Reliability items				Usefulness items			Reliability rating	Usefulness rating	Overall quality	Decision
	Q1: Were steps taken to strengthen rigor in the sampling?	Q2: Were steps taken to strengthen rigor in the data collected?	Q3: Were steps taken to strengthen the rigor of the analysis of data?	Q4: Were the findings of the study grounded in/supported by the data?	Q5: Rate the findings of the study in terms of their breadth and depth	Q6: Privileges participants' perspectives/experiences?	Q7: Consider Q1-4				
26. Sedighi et al. (2015)	Unmet	Met	Met	Met	Medium	Met	Medium	Medium	Medium	Medium	Inclusion
27. Spaaij (2012)	Unmet	Met	Met	Met	High	Met	Medium	High	High	High	Inclusion
28. Usman (2009)	Unmet	Met	Met	Met	High	Met	Medium	High	High	High	Inclusion
29. Van der Bijl and Lawrence (2019)	Unmet	Met	Unmet	Met	Medium	Unmet	Medium	Medium	Medium	Medium	Inclusion
30. Veazey (2014)	Met	Met	Unmet	Met	High	Met	Medium	High	High	High	Inclusion
31. Vong et al. (2017)	Unmet	Met	Met	Met	Medium	Met	Medium	Medium	Medium	Medium	Inclusion
32. Walker (2007)	Unmet	Met	Unmet	Met	Medium	Unmet	Medium	Medium	Medium	Medium	Inclusion
33. Walker (2009)	Met	Met	Unmet	Met	Medium	Met	Medium	Medium	Medium	Medium	Inclusion
34. Woronov (2011)	Unmet	Met	Unmet	Met	Medium	Unmet	Medium	Medium	Medium	Medium	Inclusion

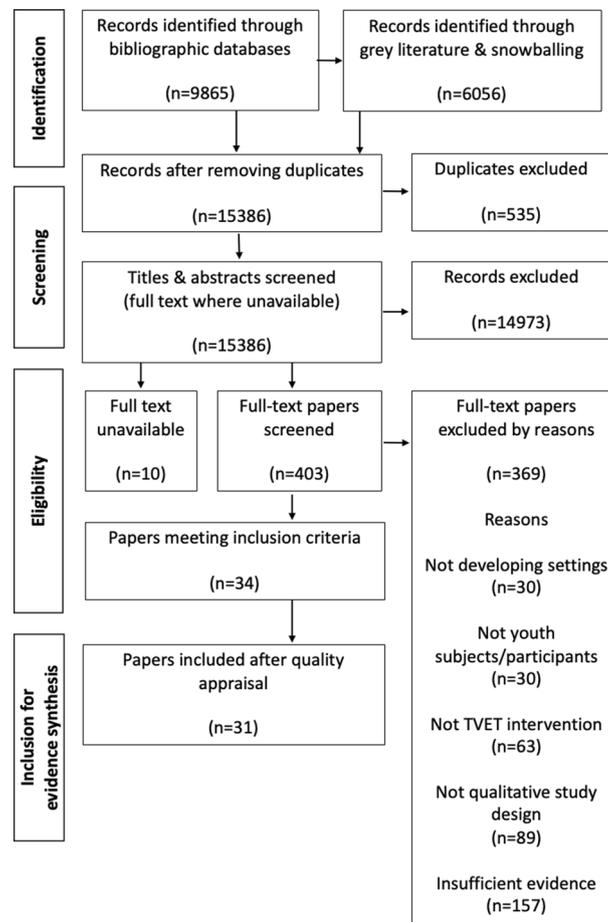


Fig. 1 PRISMA Flow Diagram of the Study Selection Process

components, such as life skills¹ training, entrepreneurship education and labor intermediation services. Included interventions were offered in multiple business sectors or trades, including agriculture, construction, business process outsourcing, information and communication technology (ICT), hospitality, art and crafts, automobile repair, tailoring and hairdressing. Half of the interventions offered participants short-term skills training, most of which were implemented by third sector organizations. Twelve interventions provided long-term education and training at secondary or post-secondary level, which were mainly provided by the public sector. Three interventions had fewer formal arrangements either through apprenticeship with trade masters or on-the-job training with private employers. All interventions targeted young people as participants, the majority of which recruited both male and female participants. Over 70 per cent of the interventions targeted disadvantaged and marginalized young people who mainly fell into two groups, those requiring special needs and those from poor socio-economic background, though the two groups sometimes overlapped with each other.

¹ This review defined "life skills" as "a broad set of skills, competencies, behaviors, attitudes, and personal qualities that enable people to effectively navigate their environment, work well with others, perform well, and achieve their goals" (Lippman et al. 2015, p. 4). It is synonymous with soft skills, non-cognitive skills and twenty-first century skills.

Table 2 A description of the included studies

Studies	Locations	Methodology	Interventions	Reported experiences
1. Adhikari (2018)	Asia Nepal Low income	Study design: qualitative phenomenological study Subjects: students (N = 8; age: 18–32; gender: mixed) Data collection: in-depth interview Data analysis: thematic analysis	TVET type (V, T, O, A*): skills training program at vocational centers (V) Non-technical component: not available (N/A) Business sector: multiple (not specified) Duration & format: short-term skills training Provider: government-led initiatives Target groups: learners with disabilities	Process**: IQ; LE Outcome***: N/A
2. Alcid (2014)	Africa Rwanda Low income	Study design: mixed methods Subjects: graduates (N = 34; age: 14–35; gender: mixed) Data collection: focus group discussions Data analysis: thematic analysis	TVET type: Akazi Kanoze program (V, O) Non-technical component: life skills; entrepreneurship training; mentoring & coaching; literacy & numeracy Business sector: hair dressing, hospitality, masonry, carpentry, welding, and tailoring Duration & format: short-term skills training Provider: third sector organization Target groups: N/A	Process: N/A Outcome: CC; EC; As
3. Apunda et al. (2017)	Africa Kenya Lower-middle income	Study design: qualitative case study Subjects: students (N = 10; age: 16–35; gender: dominantly female) Data collection: semi-structured interview Data analysis: thematic analysis	TVET type: informal tailoring apprenticeship training (A) Non-technical component: N/A Business sector: tailoring Duration & format: flexible arrangement with trade masters Provider: private trade masters Target groups: N/A	Process: IQ Outcome: N/A
4. Bhurtel (2016)	Asia Nepal Low income	Study design: qualitative case study Subjects: graduates (N = 5; age: N/A; gender: N/A) Data collection: semi-structured interview Data analysis: N/A	TVET type: Technical School Leaving Certificate program (V, T, O) Non-technical component: N/A Business sector: mechanical engineering Duration & format: longer-term education and training Provider: schools/colleges Target groups: N/A	Process: IQ Outcome: SC; EC

Table 2 (continued)

Studies	Locations	Methodology	Interventions	Reported experiences
5. Botea et al. (2015)	Africa Rwanda Low income	Study design: mixed methods Subjects: students (N = 94; age: 15–25; gender: female) Data collection: semi-structured interviews and focus group discussions Data analysis: content and thematic analysis	TVET type: Promoting the Economic Empowerment of Adolescent Girls and Young Women Project (V) Non-technical component: life skills; entrepreneurship training; labor intermediation services; mentoring & coaching Business sector: arts and crafts, culinary arts, food processing, and agribusiness Duration & format: short-term skills training Provider: government-led initiatives Target groups: marginalized girls and young women	Process: IQ; LE Outcome: CC; EC; HH
6. da Luz et al. 2012	South America Brazil Upper-middle income	Study design: qualitative Subjects: students (N = 40; age: 14–20; gender: mixed) Data collection: individual and collective interviews Data analysis: content analysis	TVET type: First Job program (O, A) Non-technical component: labor intermediation services; career counseling Business sector: multiple service sectors Duration & format: flexible arrangement with private employers Provider: third sector organization Target groups: low-income neighborhood	Process: IQ Outcome: HH
7. Darkwah (2013)	Africa Ghana Lower-middle income	Study design: qualitative Subjects: students & graduates (N = 14; age: over 50% 20–24; gender: mixed) Data collection: in-depth interviews Data analysis: content analysis	TVET type: Alpha Beta vocational training program (V, O) Non-technical component: N/A Business sector: oil and gas Duration & format: short-term skills training Provider: private training agency Target groups: rural youth with secondary schooling, but little prospects for tertiary education	Process: N/A Outcome: SC; EC; As

Table 2 (continued)

Studies	Locations	Methodology	Interventions	Reported experiences
8. DeJaeghere (2018)	Africa Tanzania Low income	Study design: qualitative Subjects: students (N = 2; age: N/A; gender: female) Data collection: in-depth interview Data analysis: N/A	TVET type: education at vocational high schools (V, O) Non-technical component: entrepreneurship training Business sector: agriculture, livestock keeping, motorcycle maintenance, driving, masonry and carpentry, hospitality, cooking, knitting, and sewing Duration & format: longer-term education and training Provider: third sector organization Target groups: N/A	Process: LE Outcome: CC; SC; EC; As
9. DeJaeghere et al. (2019)	Africa Tanzania & Uganda Low income	Study design: mixed methods Subjects: students (N = 67; age: 14–22; gender: mixed) Data collection: in-depth interview Data analysis: thematic analysis	TVET type: Swisscontact (V, A) Non-technical component: life skills; entrepreneurship training; labor intermediation services; financial literacy; career counseling; financial support Business sector: auto/motorbike repair, electrical wiring, hairdressing, tailoring, hospitality, agricultural production, and sales Duration & format: short-term skills training Provider: third sector organization Target groups: out-of-school marginalized youth	Process: N/A Outcome: CC; EC
10. Donkor (2012)	Africa Ghana Lower-middle income	Study design: qualitative Subjects: Non-completers (N = 60; age: 95% 18–30; gender: dominantly male) Data collection: interviews Data analysis: N/A	TVET type: informal automotive apprenticeship training (A) Non-technical component: N/A Business sector: automotive trades Duration & format: flexible arrangement with trade masters Provider: private trade masters Target groups: N/A	Process: IQ; LE Outcome: N/A

Table 2 (continued)

Studies	Locations	Methodology	Interventions	Reported experiences
11. Jacobs and Col-lair (2017)	Africa South Africa Upper-middle income	Study design: qualitative Subjects: graduates (N = 4; age: 18–20; gender: mixed) Data collection: semi-structured interview Data analysis: thematic analysis	TVET type: education at vocationally oriented special needs schools (V, T) Non-technical component: N/A Business sector: multiple (not specified) Duration & format: longer-term education and training Provider: schools/colleges Target groups: learners who experience barriers to learning due to cognitive, behavioral or specific learning difficulties,	Process: LE Outcome: CC; SC; As
12. Koo (2016)	Asia China Upper-middle income	Study design: mixed methods Subjects: students (N = 24; age: N/A; gender: mixed) Data collection: in-depth interviews Data analysis: N/A	TVET type: education at vocational high schools (V, T, O) Non-technical component: N/A Business sector: multiple (not specified) Duration & format: longer-term education and training Provider: schools/colleges Target groups: rural youth	Process: IQ Outcome: CC; EC; As
13. Korzh (2013)	Europe Ukraine Lower-middle income	Study design: qualitative case study Subjects: students & graduates (N = 58; age: N/A; gender: mixed) Data collection: semi-structured interviews and focus group discussions Data analysis: N/A	TVET type: education at vocational schools (V, T) Business sector: multiple (not specified) Non-technical component: N/A Duration & format: longer-term education and training Provider: public schools/colleges Target groups: orphans and children from single parent and low-income families	Process: IQ Outcome: CC; EC; As

Table 2 (continued)

Studies	Locations	Methodology	Interventions	Reported experiences
14. Latopa and Rashid (2015)	Africa Nigeria Lower-middle income	Study design: qualitative case study Subjects: graduates (N = 21; age: N/A; gender: N/A) Data collection: in-depth interviews and focus group discussions Data analysis: N/A	TVET type: integrated Youth Training Farm Program (V) Non-technical component: N/A Business sector: agriculture Duration & format: short-term skills training Government-led initiatives Target groups: N/A	Process: N/A Outcome: CC; SC; EC
15. Lefebvre et al. (2018)	Africa Kenya Lower-middle income Tanzania & Uganda Low income	Study design: mixed methods Subjects: students (N = 130; age: 16–25; gender: mixed) Data collection: interviews Data analysis: N/A	TVET type (1): CAP Youth Empowerment Institute (V, O) Non-technical component (1): life skills; financial literacy TVET type (2): Swiss-contact (V, A) Non-technical component (2): life skills; entrepreneurship training; labor intermediation services; financial literacy; career counseling; financial support Business sector: multiple (not specified) Duration & format: short-term skills training Provider: third sector organization Target groups: marginalized youth	Process: N/A Outcome: CC; EC; As
16. Ling (2015)	Asia China Upper-middle income	Study design: qualitative Subjects: students (N = N/A; age: N/A; gender: mixed) Data collection: N/A Data analysis: N/A	TVET type: education at vocational high schools (V, T) Non-technical component: N/A Business sector: multiple (not specified) Duration & format: longer-term education and training Provider: public schools/colleges Target groups: rural migrant students	Process: IQ; LE Outcome: SC; As

Table 2 (continued)

Studies	Locations	Methodology	Interventions	Reported experiences
17. Management Systems International and A Tetra Tech Company (2017)	Africa Kenya Lower-middle income	Study design: mixed methods Subjects: graduates (N = 21; age: 18–35; gender: mixed) Data collection: interviews and focus group discussions Data analysis: thematic analysis	TVET type: Kenya Youth Employment and Skills program (V, O) Non-technical component: life skills; entrepreneurship training; labor intermediation services Business sector: multiple (not specified) Duration & format: short-term skills training Provider: third sector organization Target groups: unemployed & underemployed youth	Process: IQ Outcome: CC; EC
18. Matsumoto (2018)	Africa Sierra Leone Low income	Study design: qualitative case study Subjects: students (N = 15; age: N/A; gender: mixed) Data collection: interviews, focus group discussions, task-based participatory methods, participant observation Data analysis: N/A	TVET type: education at TVET centers (V, T, O) Non-technical component: N/A Business sector: masonry and home management Duration & format: longer-term education and training Provider: training centers Target groups: N/A	Process: N/A Outcome: CC; EC; As
19. Murtaza et al. (2018)	Asia Pakistan Lower-middle income	Study design: mixed methods Subjects: students & graduates (N = 55; age: 16–29; gender: mixed) Data collection: interviews Data analysis: content analysis	TVET type: Punjab Youth Workforce Development Project (V, O, A) Non-technical component: life skills; entrepreneurship training; labor intermediation services; career counseling; financial support Business sector: multiple (not specified) Duration & format: short-term skills training Provider: third sector organization Target groups: at-risk youth	Process: N/A Outcome: CC; SC; EC

Table 2 (continued)

Studies	Locations	Methodology	Interventions	Reported experiences
20. Nagamuthu et al. (2019)	Asia Malaysia Upper-middle income	Study design: qualitative Narrative study Subjects: students (N = 2; age: 18; gender: female) Data collection: semi-structured interview Data analysis: inductive content analysis	TVET type: vocational program at Integrity School (V) Non-technical component: N/A Business sector: not specified Duration & format: short-term skills training Provider: juvenile prison Target groups: juvenile delinquents	Process: IQ; LE Outcome: CC
21. Neroorkar and Gopinath (2019)	Asia India Lower-middle income	Study design: mixed methods Subjects: graduates (N = 15; age: 18–33; gender: mixed) Data collection: interviews Data analysis: content analysis	TVET type: education at Industrial Training Institutes (V, T, A) Non-technical component: N/A Business sector: fitter, welder, machinist, mechanical draughtsman, diesel mechanic, carpenter, electrician, computer operator and programming assistant, dress making, cosmetology, secretarial practice and food production Duration & format: longer-term education and training Provider: public schools/colleges Target groups: N/A	Process: IQ; LE Outcome: CC; SC; EC; As
22. Powell (2012)	Africa South Africa Upper-middle income	Study design: qualitative Subjects: students & graduates (N = 20; age: N/A; gender: mixed) Data collection: in-depth interviews Data analysis: N/A	TVET type: education at further education and training colleges (V, T) Non-technical component: N/A Business sector: multiple (not specified) Duration & format: longer-term education and training Provider: public schools/colleges Target groups: disadvantaged youth	Process: N/A Outcome: As

Table 2 (continued)

Studies	Locations	Methodology	Interventions	Reported experiences
23. Sedighi et al. (2015)	Asia Iran Upper-middle income	Study design: qualitative case study Subjects: graduates (N = 7; age: N/A; gender: male) Data collection: semi-structured interview Data analysis: thematic analysis	TVET type: education at vocational high schools (V,T) Non-technical component: N/A Business sector: multiple (not specified) Duration & format: longer-term education and training Provider: public schools/colleges Target groups: N/A	Process: IQ Outcome: CC; SC; EC
24. Spaaij 2012	South America Brazil Upper-middle income	Study design: mixed methods Subjects: graduates (N = 53; age: 16–24; gender: mixed) Data collection: semi-structured interview Data analysis: thematic analysis	TVET type: Vencer sport-based program (V, O) Non-technical component: life skills; mentoring & coaching Business sector: telemarketing, administration, ICT, sales, and community services Duration & format: short-term skills training Provider: third sector organization Target groups: disadvantaged youth	Process: IQ Outcome: CC; SC
25. Usman (2009)	Africa Nigeria Lower-middle income	Study design: ethnographic study Subjects: students & graduates (N = 15; age: 12–20; gender: male) Data collection: interviews and non-participant observations Data analysis: thematic analysis	TVET type: Millennium Hope Project (V) Non-technical component: financial literacy; literacy and numeracy; financial support Business sector: carpentry, soap making, mechanic, welding, cobbling, typing, masonry, landscaping, agriculture, and arts and crafts Duration & format: short-term skills training Provider: government-led initiatives Target groups: disadvantaged Muslim <i>Almajiri</i> boys	Process: N/A Outcome: CC; SC; EC; As; HH

Table 2 (continued)

Studies	Locations	Methodology	Interventions	Reported experiences
26. Van der Bijl and Lawrence (2019)	Africa South Africa Upper-middle income	Study design: qualitative Subjects: graduates and non-completers (N = 6; age: N/A; gender: N/A) Data collection: interviews Data analysis: N/A	TVET type: National Certificate (Vocational) civil and construction program (V) Non-technical component: N/A Business sector: civil and construction Duration & format: longer-term education and training Provider: public schools/colleges Target groups: N/A	Process: IQ; LE Outcome: N/A
27. Veazey (2014)	Asia India Lower-middle income	Study design: qualitative case study Subjects: students (N = N/A; age: avg. 21.6; gender: mixed) Data collection: semi-structured interviews & sustained ethnographic observations Data analysis: N/A	TVET type: LACES livelihoods training program (V, A) Non-technical component: life skills Business sector: business process outsourcing Duration & format: short-term skills training Provider: third sector organization Target groups: working-class and working-poor Muslim youth	Process: IQ Outcome: CC; SC
28. Vong et al. (2017)	Asia Malaysia Upper-middle income	Study design: qualitative case study Subjects: graduates (N = 15; age: N/A; gender: N/A) Data collection: semi-structured interview Data analysis: thematic analysis	TVET type: Rural ICT Guided Home-Based Technopreneur program (V, O) Non-technical component: life skills; entrepreneurship training Business sector: ICT Duration & format: short-term skills training Provider: private enterprise Target groups: N/A	Process: IQ Outcome: CC; EC
29. Walker (2007)	Europe Russia Upper-middle income	Study design: qualitative case study Subjects: students & graduates (N = 96; age: N/A; gender: mixed) Data collection: semi-structured interview Data analysis: N/A	TVET type: education at vocational training colleges (V, T) Non-technical component: N/A Business sector: multiple (not specified) Duration & format: longer-term education and training Provider: public schools/colleges Target groups: N/A	Process: N/A Outcome: EC; As

Table 2 (continued)

Studies	Locations	Methodology	Interventions	Reported experiences
30. Walker (2009)	Europe Russia Upper-middle income	Study design: qualitative case study Subjects: students & graduates (N = 96; age: 15–24; gender: mixed) Data collection: semi-structured interview Data analysis: N/A	TVET type: education at vocational training colleges (V, T) Non-technical component: N/A Business sector: multiple (not specified) Duration & format: longer-term education and training Provider: public schools/colleges Target groups: N/A	Process: N/A Outcome: EC; As
31. Woronov (2011)	Asia China Upper-middle income	Study design: ethnographic study Subjects: students (N = N/A; age: N/A; gender: mixed) Data collection: interviews & observations Data analysis: N/A	TVET type: education at vocational high schools (V, T) Non-technical component: N/A Business sector: multiple (not specified) Duration & format: longer-term education and training Provider: schools/colleges Target groups: N/A	Process: LE Outcome: SC; EC

* TVET types are denoted as follows: V: vocational education and training, T: technical education, O: on-the-job training, A: apprenticeship training

** Reported process experiences are denoted as follows: IQ: intervention quality, LE: learning environment

*** Reported outcome experiences are denoted as follows: CC: cultural capital related consequences, SC: social capital related consequences, EC: economic capital related consequences, As: aspiration, HH: health and hygiene

The reported qualitative evidence of young people's TVET experiences was categorized into two major groups: process experiences and outcome experiences. The former emphasized on young people's "user" experiences and feedbacks on intervention design and implementation. The latter focused on the impact of young people's TVET participation on their personal life and wellbeing. Over half of the publications reported both groups of evidence.

Young people's learning experiences during TVET participation

To address Review Question 1, qualitative data on young people's process experiences under two domains, intervention quality and learning environment were extracted from 21 publications. A summary of results was presented in Table 3.

Intervention quality

Young people's experiences of intervention quality included three themes, curriculum and content, instruction and instructor, and management and administration. The majority of participants in 13 studies that contained evidence of curriculum and content reported negative experiences (Apunda et al. 2017; Bhurtel 2016; Botea et al. 2015; da Luz et al. 2012; Donkor 2012; Koo 2016; Korzh 2013; Ling 2015; Management Systems International and A Tetra Tech Company 2017; Neroorkar and Gopinath 2019; Van der

Table 3 A Summary of Young People's Learning Experiences

Domains	Themes	Positive experiences	Negative experiences
Intervention quality	Curriculum and content	Practical training content	Irrelevant training trades and skills Theory-focused curriculums Short duration of training sessions Exploitation of trainees and apprentices as cheap labor
	Instruction and instructor quality	Effective pedagogy Competent instructors	Authoritarian pedagogy Instructors' negligence Instructors' inattentiveness to minorities' learning needs
	Administration and management		Inefficient and ineffective administrative services Poor management of student performance
Learning environment	Physical environment		Scarcity of material resources Failure to address needs of some subgroups
	Instructor-learner relationship	Study and work support Emotional support	Differential treatment to different students Distant and indifferent relationship
	Peer relationship	Supportive and equal relationship	Negative influence of peers' poor performance Peers' bully and mocking behavior Isolation by peers

Bijl and Lawrence 2019; Veazey 2014; Walker 2007, 2009). Some interventions taught trades that were either out-of-date or irrelevant for local job markets. Some interventions failed participants' expectation to impart practical skills. Since several included interventions were short-term programs delivered by non-governmental organizations (NGOs), some participants found hard to absorb new knowledge and skills within a short period. In comparison with vocational and technical education and training, apprenticeship and on-the-job training included in this review had less structured content that were largely subject to each provider, leading to a variation of training quality. Although few participants appreciated the practicality of training content (Bhurtel 2016; Nagamuthu et al. 2019; Neroorkar and Gopinath 2019; Spaaij 2012), young people in several studies were reportedly assigned to non-skilled menial work as cheap labor without proper guidance and personal growth (Apunda et al. 2017; da Luz et al. 2012; Donkor 2012; Koo 2016; Neroorkar and Gopinath 2019).

Young people's learning experiences were also affected by the quality of instruction and instructors (Adhikari 2018; Apunda et al. 2017; Bhurtel 2016; Ling 2015; Sedighi et al. 2015; Veazey 2014). While few participants considered their instructors competent (Apunda et al. 2017), others lamented the textbook-based authoritarian pedagogy that discouraged them to develop intellectual curiosity and critical thinking ability (Veazey 2014). They were either told to imitate the instructor's practice or to memorize certain knowledge on textbooks without understanding underlying rationales. Some other young people, especially those enrolled in interventions run by the public sector, were frustrated about their instructors' negligence and lack of commitment. Within the

formal educational system in many developing countries, TVET is widely considered inferior to academic education. This stigmatization often creates a vicious cycle where teachers—who are hired through a less strict and competitive process—behave negligently as they believe their students are low achievers who do not care about their study (Ling 2015). In return, their indifference discourages the motivation of students who are already discredited by the system. Furthermore, some instructors failed to address the learning needs of the minority students. For instance, learners with disabilities in mainstream vocational centers reported that students with physical disabilities could understand the subject matter but had difficulty in performing the tasks, but those with visual and hearing impairments could not understand the lecture at all (Adhikari 2018).

In addition, ineffective administration and management of interventions compromised participants' learning (Adhikari 2018; Botea et al. 2015; Bhurtel 2016; Korzh 2013; Ling 2015; Nagamuthu et al. 2019; Van der Bijl and Lawrence 2019). Poor administrative support for course enrollment, equipment maintenance, stipend distribution and transcript issuance disrupted young people's study and even made some participants quit. Others were frustrated by some schools' laissez-faire approach to manage and evaluate student performance. Some vocational schools reportedly let students get away with poor attendance, plagiarism, and bribery, as they had to stay in business by attracting all kinds of students (Korzh 2013; Ling 2015). This lack of accountability largely discouraged those hard-working students who received the same certificate as those less diligent ones. The slack management not only led to students' poor performance, but also harmed graduates' reputation among employers. On the opposite side, participants in prison school complained that the authority focused too much on student discipline that their learning was frequently interrupted by roll call and discipline during class (Nagamuthu et al. 2019).

Learning environment

Participants' experiences of learning environment covered three themes, physical environment, instructor-learner relationship, and peer relationship. Several studies reported young people's dissatisfaction with their physical learning environment (Adhikari 2018; Botea et al. 2015; Donkor 2012; Sedighi et al. 2015; Veazey 2014). Since most of the included interventions were implemented in resource-poor settings, young people often found themselves contend with run-down buildings, inadequate number of equipment, shortage of teaching materials and frequent power and network outage (Sedighi et al. 2015; Veazey 2014). These uncertainties disrupted training activities from time to time, which largely compromised the training quality. In addition, the physical environment of many interventions failed to cater to the needs of different subgroups, especially those minorities. For example, participants with disabilities could have more mobility in accessing classrooms and toilets, if the physical environment of mainstream vocational centers had been more disability friendly (Adhikari 2018). Some female participants regretted the lack of childcare facilities on the training site (Adhikari 2018; Botea et al. 2015). Many of them had to leave their children at home and seek extra help for babysitting, causing them both financial and emotional burdens. Apart from childcare support, female participants emphasized on the girl-friendly learning environment where they could feel comfortable. Although some girl-only interventions intended to set up

girl rooms and provide amenities, not all providers delivered on the ground (Botea et al. 2015).

Participants in several studies described their relationships with instructors as supportive, motivating and nurturing (Adhikari 2018; Botea et al. 2015; DeJaeghere 2018; Jacobs and Collair 2017; Neroorkar and Gopinath 2019; Van der Bijl and Lawrence 2019). The amicable relationship was beneficial to young people both materially and emotionally. Instructors reportedly provided direct support to young people's study and work and offered emotional support to keep them motivated and build up their self-esteem. This positive influence was especially important for those marginalized youth who received limited social support (Jacobs and Collair 2017). Interestingly, three studies that reported positive experiences also included negative ones (Adhikari 2018; Jacobs and Collair 2017; Neroorkar and Gopinath 2019). Some participants with disabilities in Nepal found their instructors were more attentive to their peers without disabilities (Adhikari 2018). Vocational students in India felt frustrated by their instructors' distant and indifferent position (Neroorkar and Gopinath 2019). In Jacobs and Collair (2017), one participant suffered from corporal punishment and unequal treatment. The variation of young people's experiences suggested that like other relationships, instructor-learner relationship is subject to various personal and interpersonal factors.

The evidence also painted a mixed picture of young people's relationship with their peers. On the one hand, some participants found themselves more powerful and less disoriented when they discussed their study and future with their peers (DeJaeghere 2018; Jacobs and Collair 2017). Young people, particularly those with special needs, tended to find a sense of belonging by interacting with others with similar background and capabilities. On the other hand, participants in several studies reported adverse peer relationships (Adhikari 2018; DeJaeghere 2018; Donkor 2012; Ling 2015; Van der Bijl and Lawrence 2019). Some participants found the school a demotivating setting as most of their peers only wanted to get by with minimum effort (Ling 2015). Having spent some time in this environment, young people tended to follow the passive behavior. Since many participants of TVET interventions came from a disadvantaged background with poor education history, they were more likely to create a discouraging learning environment for each other. Furthermore, some young people were bullied and teased by their peers. Among all studies, only one case of physical abuse was reported (Donkor 2012). All other cases were related to peers' mocking behavior, which, interestingly, could all be attributed to studying a trade or a subject that was not conventionally conformed with the learner's gender (DeJaeghere 2018). Female participants who studied in traditionally male-dominated sectors, for example, were frequently bothered by their male peers and called as "man woman" (Donkor 2012, p. 33). This sense of othering often alienated participants from peer support and diminished their confidence (Adhikari 2018; Van der Bijl and Lawrence 2019). Isolation from peers was identified as a key factor leading to attrition.

Young people's consequences of TVET participation

To address Review Question 2, qualitative evidence of young people's outcome experiences was extracted from 26 publications in five domains, cultural capital, social capital, economic capital, aspiration, and health. A summary of results was presented in Table 4.

Table 4 A Summary of Young People’s Participation Consequences

Domains	Themes	Positive consequences	Negative consequences
Cultural capital related consequences	Skills and knowledge	Improved technical skills Improved non-technical skills	Limited depth and impracticality of skills obtained
	Certificates	Increased employability due to proof for education history and skill level	Failure to obtain a certificate Poor recognition of certificates
	Socio-emotional competencies	Improved self-awareness and self-confidence Improved self-management Improved social awareness Enhanced capability to maintain healthy and rewarding relationships Improved decision-making ability	
Social capital related consequences	Bonding social capital	Lasting support network among peers	
	Bridging social capital	Established connections with peers from different backgrounds, program staff and alumni Increasing support and recognition from family and community	Difficulty in maintaining social ties after intervention completion Extra burden caused by increasing reliance from family and community Stigmatization as a tvet participant
	Linking social capital	Linkage with a wider network of government officials, professionals and financial service providers	
Economic capital related consequences	Economic prospect	Increased employability and expanded economic opportunities	Bleak prospect due to poor training value and poor recognition of vocational credentials
	Economic activities	Increased involvement in mostly small-scale businesses	Difficulty in getting employed Poor quality of available jobs
	Economic gains	Rise in economic gains Income diversification	Low pay of available jobs Unsustainability of income source
Aspiration		Increased capability to aspire Willingness to pursue further learning Increased motivation to make plans for future	Discouragement of harsh reality Disorientation due to lack of support for school-to-work transition
Health and hygiene		Acquirement of personal and environmental health practices Improved access to healthcare due to improved finance	Physical fatigue and psychological stress Drug abuse to ease fatigue

Cultural capital related consequences

Cultural capital refers to cultural goods, knowledge, experience, education, habits, competencies and skills which an individual possesses, and which confer power or status in

the social hierarchy (Bourdieu 1986, p. 17). This review borrowed this concept to cover young people's experiences of acquiring skills and knowledge, obtaining certificates, and cultivating socio-emotional competencies.

Skills and knowledge Youth participants in 10 studies reportedly gained new technical skills and knowledge (Alcid 2014; Darkwah 2013; DeJaeghere 2018; Jacobs and Collair 2017; Latopa and Rashid 2015; Management Systems International and A Tetra Tech Company 2017; Matsumoto 2018; Neroorkar and Gopinath 2019; Sedighi et al. 2015; Spaaij 2012; Veazey 2014; Vong et al. 2017). As participants' first exposure to certain industries, some interventions enabled them to better understand the chosen field and equipped them with foundational skills and knowledge (Neroorkar and Gopinath 2019; Veazey 2014). Others capitalized on the training opportunities to improve their skills for further education or business upgrade (Management Systems International and A Tetra Tech Company 2017). Young people's skills development was largely associated with curriculum design and instruction quality. Practical and effective training often contributed to positive consequences. Besides, participants, particularly those enrolled in interventions including non-technical components, enhanced their life skills, work readiness skills, financial management skills, business development skills and literacy skills (Alcid 2014; Botea et al. 2015; Management Systems International and A Tetra Tech Company 2017; Spaaij 2012; Usman 2009; Veazey 2014).

Certificates Apart from gaining actual skills, TVET participation offered young people opportunities for obtaining credentials, the value of which was largely associated with the intervention's reputation and social recognition. On the one hand, participants who were previously excluded from formal education system increased their employability in formal employment with certificates to testify their skills level (DeJaeghere et al. 2019; Murtaza et al. 2018; Nagamuthu et al. 2019). Certificates from reputable programs brought extra value to young people's job prospect (Bhurtel 2016; Neroorkar and Gopinath 2019). On the other hand, some participants either failed to obtain a certificate or had little faith in their credentials due to the poor recognition of TVET by employers and the society as a whole (Koo 2016). In Korzh (2013), since university diplomas were required for all non-manual job, some young people decided to pursue a new university degree despite having several vocational degrees. Some participants of short-term programs found that although their certificates could sometimes serve as a proxy credential due to programs' good reputation, many employers still required more formal, government-recognized credentials in certain trades (Lefebvre et al. 2018).

Socio-emotional competencies TVET participation also shaped young people's disposition, attitude, and mindset in dealing with personal and professional matters. The majority of participants improved their socio-emotional competencies in five areas.² Firstly, several studies (Botea et al. 2015; Jacobs and Collair 2017; Management Systems International and A Tetra Tech Company 2017; Matsumoto 2018; Murtaza et al. 2018; Nagamuthu et al. 2019; Vong et al. 2017) reported young people's enhanced self-awareness in

² The five areas, namely, self-awareness, self-management, social awareness, relationship skills, and responsible decision-making, were cited from Collaborative for Academic, Social, and Emotional Learning's integrated social and emotional learning framework (<https://casel.org/core-competencies/>).

terms of accurately recognizing and assessing their mindset (Collaborative for Academic, Social, and Emotional Learning 2020). Coming from a poor socio-economic background, most participants held a low self-esteem and lacked faith in themselves. Their self-confidence was greatly improved, as they learned to accept themselves thanks to the life skills training and witnessed their personal development during the interventions. Secondly, driven by their enhanced self-confidence and positive learning experiences, some participants improved their self-management ability of setting goals and cultivating a sense of self-discipline to achieve them (Nagamuthu et al. 2019). Some participants of life skills training also learned to manage their emotions and impulses in the face of challenges (Alcid 2014).

Thirdly, Veazey (2014) reported participants' improved awareness of social and ethical norms and empathy with other people (Collaborative for Academic, Social, and Emotional Learning 2020). By exposing marginalized young people to the aesthetic, linguistic and behavioral norms of the formal sector, Livelihoods and Commerce Education School (LACES) program in India prepared participants to interact with all kinds of people at work and reduced their fear for the unknown professional sphere. Fourthly, some participants enhanced their capability to maintain healthy relationships. Intervention components, such as communication skills training and team sports, empowered young people to speak in the public and network with others with confidence and respect, which opened up both professional and personal opportunities for them (Alcid 2014; Murtaza et al. 2018; Spaaij 2012). Lastly, some participants found TVET participation beneficial to their decision-making ability. With enhanced skills and confidence, participants were more motivated to improve their economic and living conditions. This sense of purpose propelled them to make selective choices and become increasingly conscious of the value of time, the benefits of hard work and work ethics (Management Systems International and A Tetra Tech Company 2017; Usman 2009). They also tended to contribute constructively to community and public affairs instead of idling around and getting into religious and political conflicts (Murtaza et al. 2018; Usman 2009).

Social capital related consequences

Social capital is the total of actual or virtual resources that an individual or a group accumulates by possessing a durable network of relationships of mutual acquaintance and recognition (Bourdieu 1986, p. 21). This review adopted three types of social capital, bonding, bridging and linking social capital, to frame young people's experiences.

Bonding social capital TVET interventions provided space and time for young people to mingle with one another, and thus built up their bonding social capital—relationships among members of a network who are similar in some form (Putnam 2000). The meaningful peer interaction not only boosted participants' learning experiences, but also created a lasting support network that would benefit them after the completion of training. In some cases, some interventions were purposefully designed to establish connections among participants. For example, participants in integrated training farm in Nigeria were put into several groups during the training and encouraged to form agriculture cooperatives upon graduation (Latopa and Rashid 2015). Such arrangements well capitalized on

young people's bonding social capital and largely increased their economic prospects. In some other cases, young people naturally formed close ties with one another due to shared life trajectory and challenges, which later became a source of their social and emotional support (Spaaij 2012; Lefebvre et al. 2018).

Bridging social capital Bridging social capital refers to relationships amongst people who are dissimilar in a demonstrable fashion, such as age and socio-economic status (Szreter and Woolcock 2004). TVET participation not only directly influenced young people's relationships with peers from different backgrounds, program staff and alumni, but also indirectly changed their ties with families and communities. Although most interventions included recruited homogeneous groups, some opened up social spaces for young people to interact with peers from different social classes (Spaaij 2012). For example, by establishing friendship with their urban classmates, second generation rural migrants in China's urban vocational schools were introduced to modern lifestyles that were impossible to imagine for their parents' generation (Ling 2015; Woronov 2011). Instructors and program staff formed another source of participants' bridging social capital (Latopa and Rashid 2015; Spaaij 2012). Apart from developing professional contacts through apprenticeship and on-the-job training (Neroorkar and Gopinath 2019), some participants remained in contact with their instructors after graduation, who frequently offered them job information and opportunities (Lefebvre et al. 2018). Besides, some participants were able to establish connections with their alumni, the value of which, however, was regarded differently. Some participants believed that alumni network, as a stepping stone to wider professional spheres, enhanced their economic prospect through job and cooperation offers (Latopa and Rashid 2015). Alumni also transmitted useful life and work advice with their past experiences of being participants themselves (Lefebvre et al. 2018; Spaaij 2012). In Veazey (2014), female participants in India found alumni's insider information particularly valuable to determine if a job was suitable given various restrictions placed on women's labor market participation. Some other participants questioned the sustainability and effectiveness of alumni networks which were hard to maintain without continued support from intervention providers and often failed to secure them a job or offer them financial assistance (Lefebvre et al. 2018).

In addition to the social relationships built during the training, young people's status and reputation changed outside the intervention. On the one hand, some participants won greater recognition and respect, as they took on more family and community responsibilities with enhanced skills and economic opportunities (Lefebvre et al. 2018; Murtaza et al. 2018; Usman 2009). Young people's rising social status, in return, increased their chances for further learning opportunities, as family and community, recognizing the value of education and training, were more likely to support their future endeavor (DeJaeghere 2018). This interchange between social and cultural capital created a virtuous cycle to expand young people's overall capital accumulation and capabilities. However, the same recognition also brought participants extra burden due to the greater reliance of others. Young people were sometimes overwhelmed by their increased financial responsibility, which might put them back into poverty (Lefebvre et al. 2018). On the other hand, some participants were faced with public ridicule, as they failed to secure a job after the training (Darkwah 2013). In the context where TVET

was deemed inferior education, participants were labelled as low performers and risky groups, simply because they were enrolled in vocational programs (Ling 2015; Jacobs and Collair 2017; Sedighi et al. 2015; Woronov 2011). Some young people internalized this negative association with more rebellious and reckless behavior, which further consolidated their stereotypes and decreased their social capital.

Linking social capital Linking social capital is people's relationships built with institutions and individuals who have relative power over them (Szreter and Woolcock 2004). Some interventions endeavored to minimize the social distance between participants and higher-status figures through guest lectures, mentorship and onsite recruitment, which facilitated participants' entry into formal sector employment (Lefebvre et al. 2018; Spaaij 2012; Veazey 2014). For instance, LACES program increased young people's chances for successful recruitment by introducing them to important formal sector gatekeepers and bringing hiring managers to the training site, which enabled young people to take interviews in a familiar environment (Veazey 2014).

Economic capital related consequences

Economic capital refers to economic resources that can be converted into money and institutionalized in the form of property rights (Bourdieu 1986, p. 16). This review expanded this definition to young people's experiences related to economic prospect, activities and gains.

Economic prospect Mixed evidence was reported on participants' economic prospect. On the one hand, with accumulated cultural capital, some young people increased their employability and expanded their economic opportunities to new sectors and professions (Murtaza et al. 2018; Neroorkar and Gopinath 2019; Woronov 2011). For example, learning trades beyond the traditional sectors of stitching and embroidery enhanced female participants' employment prospect in more lucrative industries in Pakistan (Murtaza et al. 2018). For some participants who were excluded from training and education opportunities for a long time, merely enrolling in interventions improved their perceived employment prospects (Murtaza et al. 2018). Some vocational students in China believed that although they may end up in "fairly low-paying, low-prestige and low-skilled jobs in the new service economy" (Woronov 2011, p. 97), they were upwardly mobile as they were doing better than their parents.

On the other hand, some participants reported a negligible relationship between TVET and their jobs, based on their own experience, word of mouth and observations of their alumni who were either unemployed or working in a field irrelevant to their training (Koo 2016; Sedighi et al. 2015). This pessimistic view was mainly due to the poor value and recognition of vocational training and credentials on the job market. As a result, some participants sought alternative paths to improve their situation, such as continuing higher level education. It is worth noting that participants' views on their economic prospect are subject to individual differences. Several studies conducted in the similar context reported opposite evidence. For example, unlike optimistic Chinese vocational students in Woronov (2011), participants in Koo (2016) deemed vocational

credentials insufficient to secure them a proper and stable job in the city, some of whom preferred to quit TVET and look for a full-time job instead.

Economic activities Participants in several studies increased their economic activities after completing the intervention (Alcid 2014; Botea et al. 2015; DeJaeghere et al. 2019; Latopa and Rashid 2015; Management Systems International and A Tetra Tech Company 2017; Murtaza et al. 2018; Usman 2009). While some young people worked in the farm and business cooperatives facilitated by the interventions (Botea et al. 2015; Latopa and Rashid 2015), most participants found economic opportunities on their own. The majority of these activities were small-scale businesses in the informal sector that had a direct link with their trained trades and sector, ranging from farming and making and selling small merchandise to providing skilled services. Only few participants were able to secure a job in the formal sector (Lefebvre et al. 2018; Murtaza et al. 2018).

Most of the studies that reported positive experiences focused on short-term TVET interventions. Comparing with helping participants expand existing businesses, these interventions were more instrumental in supporting those unemployed or working in unskilled jobs to move to skilled jobs or self-employment (Murtaza et al. 2018). For example, the *Almajiri* boys in Nigeria, who were street beggars prior to TVET participation, became barbers and welders with acquired skills and trades. Despite the small scale of their operations, the boys' private business ownership indicated a major, positive economic transformation of their status given their prior poverty level (Usman 2009). In contrast, participants of some long-term interventions had difficulty in transitioning into employment due to the scarcity and poor quality of the available jobs (Korzh 2013). Some participants were disillusioned that the job opportunities promised by their program never came through (Darkwah 2013). Poor working conditions, long working hours, erratic working practices and delayed wages were often cited as key concerns of job quality (Bhurteel 2016; Walker 2007).

Economic gains Young people in several studies increased their economic gains to cover basic needs (Alcid 2014; DeJaeghere 2018; DeJaeghere et al. 2019; Matsumoto 2018; Vong et al. 2017) and diversified their income sources (Botea et al. 2015; DeJaeghere 2018; Management Systems International and A Tetra Tech Company 2017). While some young people appreciated that TVET participation offered them more job options to be economically resilient in developing markets characterized by frequent turmoil, some participants lamented the failure of TVET to fundamentally changed their working status and earning abilities (Korzh 2013; Lefebvre et al. 2018; Vong et al. 2017). Most participants failed to transform their learned skills and trades into a sole source of steady income and still had to pursue mixed earning strategies to sustain their livelihoods.

Although some participants acknowledged the immediate positive change of their earnings, the sustainability of their economic gains was a major concern (Botea et al. 2015; Management Systems International and A Tetra Tech Company 2017; Usman 2009). For young people who started entrepreneurial activities, one of their key challenges was the lack of post-intervention support to sustain and grow their businesses for a steady flow of earning. For instances, female participants in Rwanda established cooperatives to produce some goods but lacked the knowledge and channel to market

their products (Botea et al. 2015). In Usman (2009), graduates were often denied access to financial loans due to the lack of collateral. Since most of these young people started with limited resources to mobilize, it would be difficult for them to sustain their economic gains in a long term without further support from the program and the society as a whole.

Aspiration

TVET also affected participants' aspirations and capability to aspire—the ability of using human agency to select, conceive and create opportunities for future achievements (Appadurai 2004; Powell 2012). Before TVET participation, many young people had a low expectation for their future and passively waited for opportunities, mainly due to their low self-regard and lack of knowledge of upward pathways (Alcid 2014). With increasing skills and competencies, many participants became self-confident of their abilities of learning, working and achieving something in life (Alcid 2014; DeJaeghere 2018; Matsumoto 2018; Powell 2012; Usman 2009; Walker 2007). Through engagement with their peers, alumni, instructors and employers, young people widened their social circle and formed social connections to be leveraged for their aspirations (DeJaeghere 2018). The majority of participants aspired to achieve upward socio-economic mobility through educational and professional pursuits. Continuing education and training was the most mentioned aspiration. For participants who were previously left behind or excluded by formal academic educational systems, positive TVET experiences affirmed their learning aptitudes and reignited their interest in learning (Powell 2012; Usman 2009; Walker 2007). This self-assurance not only drove them to advance education within their vocational trades (Matsumoto 2018), but also motivated few to pursue higher education in different sectors (Korz 2013). Professionally, most participants desired jobs characterized by high income, stability and good welfare in large companies (Koo 2016; Neroorkar and Gopinath 2019) or aspired to be business owners (Ling 2015; Matsumoto 2018).

By contrast, some TVET graduates experienced a sense of disorientation due to the lack of support from school for their transition to work, such as setting professional and life goals (Jacobs and Collair 2017). Some other participants had a taste of failure when their aspirations clashed with a harsh reality (Koo 2016). In the absence of established pathways and resources to support their ambitions, many young people had to rein in their aspirations and learn to live with simple transitions into mundane work (Walker 2007).

Health and hygiene

Few studies included in this review explored participants' health status and hygiene practices. On the one hand, TVET participation brought young people health benefits both directly and indirectly. Some participants acquired personal and environmental health practices during the training to meet the hygienic standards of certain trades, such as barbering and food services (Usman 2009). They were aware that good practices not only protected the health of their clients and themselves, but also increased customer patronage and thus their earning capacities (Botea et al. 2015). Some other participants indirectly enhanced their health due to improved finance. With increased

economic activities, some young people gained access to healthcare services provided by their employers (da Luz et al. 2012). With more economic gains, some could buy more nutritious food and afford better housing and clothing (Usman 2009). With increasing earning capacities, some had a bigger say in family and community affairs and thus were less likely to experience abuse (Botea et al. 2015). The economic empowerment contributed to their health outcomes both physically and mentally. On the other hand, some participants experienced both physical and psychological burden due to a heavy workload and packed schedules. In da Luz et al. (2012), young apprentices who worked in the daytime and took class in the evening reported sleep reduction and physical discomfort due to long commute between home, work and school. The high demand and lack of support at work also posed threats to their mental health, as they were under constant pressure. In Usman (2009), some participants even resorted to drug misuse and abuse to relieve themselves from work fatigue to meet deadlines and satisfy customers.

Discussions

This review found that TVET participants' learning experiences were collectively shaped by curriculum design and delivery, administration and management as well as physical and interpersonal learning environment. Although more negative evidence was reported than positive one, this review cannot draw a conclusion on participants' overall learning experiences due to the diversity of study settings and intervention types. Most negative experiences derived from the insufficiencies of long-term formal TVET interventions, including impractical training content, negligent instructors, poor administrative services and student management, and deficient facilities. These findings were in line with many existing literature (Atchoarena and Delluc 2001; Bernardo 2011; Oketch et al. 2009), suggesting some shared challenges across the developing world. The evidence also indicated that participants' interaction with instructors and peers often led to diverse learning experiences within the same or similar context. Since most TVET participants came from a disadvantaged background, they were in more need of a stable and encouraging environment to stay engaged in learning (Becker and Luthar 2010; Murray and Zvoch 2010). To improve participants' learning experiences, an integrated approach should be taken to consider both intervention quality and learners' social surroundings.

The evidence synthesis also yielded a mixed result of various interrelated participation consequences. Firstly, most participants increased their cultural capital in the forms of skills and knowledge, credentials or socio-emotional competencies. The value of obtained skills and certificates, however, was largely determined by TVET's social reputation, which disproportionately disadvantaged participants in many settings where TVET was regarded as inferior education. In addition, most young people who reported enhanced socio-emotional competencies came from poor socio-economic background and participated in NGO-run interventions containing non-technical components. This finding echoed the need to integrate non-technical interventions into TVET which is currently missing from most formal TVET systems, so that participants, especially those underprivileged groups, can achieve a wholesome development (Amiyo 2017; Majurin 2016).

Secondly, TVET enabled many participants to accumulate three kinds of social capital—an especially valuable asset in LMICs where the society structure and operation are tightly knitted by interpersonal relationships (Chuang and Schechter 2015). While bonding and bridging social capital developed through peers, staff, instructors and alumni, to some extent, supported young people's development professionally and emotionally, they failed to address the fundamental disadvantages of most participants—their social and economic exclusion, and lack of connection with institutional power. Only few NGO interventions attempted to build participants' linking social capital by connecting them with higher-status figures. The review also revealed that family and community, though external to interventions, had a decisive influence on young people's learning and well-being. It is, therefore, important to mobilize relevant stakeholders and capitalize all available social capital to create a supportive and sustainable network for participants.

Thirdly, participants' economic experiences were closely related to their cultural capital and dependent on intervention type and participant characteristics. The review found that interventions, especially short-term skills training, added the most extra value to the livelihoods of vulnerable youth, as even a little exposure to skilled trades enhanced participants' chances for economic opportunities, activities and gains. This finding was consistent with the results of Kluge et al. (2017) that active labor market programs targeting disadvantaged youth were particularly effective in LMICs, and highlighted TVET's contribution to social equity and inclusion (Wheelahan and Moodie 2016; UNESCO 2016). Participants of some formal interventions, however, had difficulty in securing satisfying jobs. While the challenge was partly resulted from TVET's failure to train qualified workers on the supply side, young people's economic activities were also largely determined and often undermined by the volatile economy and unregulated labor market on the demand side (Kingombe 2011; Robalino et al. 2012). A comprehensive market analysis will be required to understand the impact of TVET on participants' economic outcomes.

Fourthly, the review found mixed evidence on participants' aspirations and capability to aspire. Empowered by accumulated cultural and social capital, many participants aspired to achieve upward socio-economic mobility through educational and professional pursuits. Since most included studies lacked a longitudinal study design, it remains a question whether they could achieve these aspirations. Nevertheless, participants were motivated to make plans towards their goals. By contrast, some other participants were disoriented due to the lack of clear pathways and harsh reality. Although aspiration is an internalized product that differs from one person to another, education providers have the responsibility to guide young people to navigate their future within the social structure and economic environment. Lastly, based on limited evidence from three studies, the review found while TVET participation diverted some participants from health risks and enabled them to acquire healthy practices, some young people experienced physical and psychological burden due to a heavy workload. More research is needed to investigate the health implications of TVET participation.

Based on the discussions above, this review found that young people's participation consequences were largely shaped by intervention characteristics and their learning

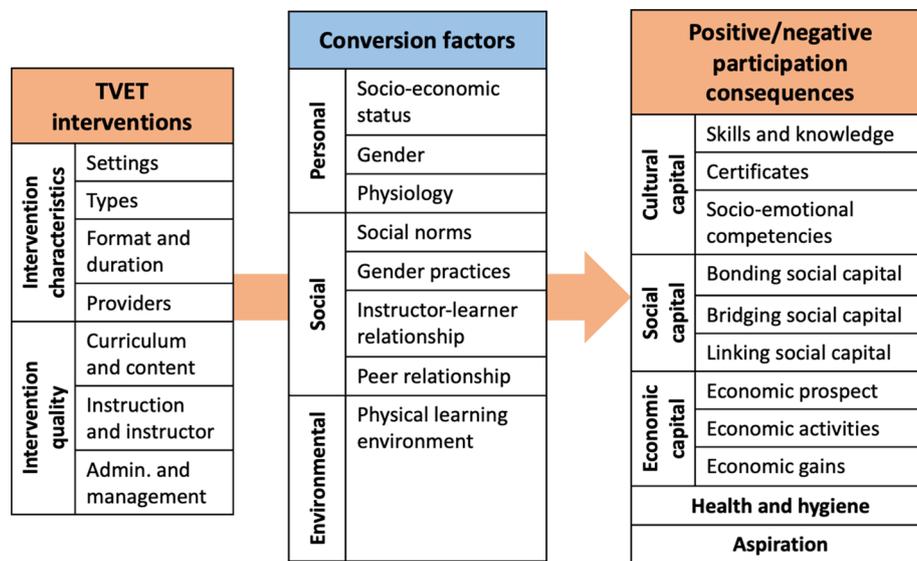


Fig. 2 A Summary Framework of Young People’s TVET Experiences

experiences, mediated by various personal, social and environmental factors. Figure 2 captured this relationship. For example, life skills training helped participants to develop socio-emotional competencies. Young people reported positive consequences of cultural and economic capital and aspiration with well-designed training content, effective pedagogy, and competent instructors. However, even participants of similar interventions had diverse consequences due to conversion factors. For instance, participants who were minorities, such as learners with disabilities in mainstream TVET and female apprentices in male-dominated sectors, often suffered from unfair treatment and isolation. In the context where social norms dictated bias against TVET, TVET participation diminished young people’s capability of accumulating cultural, social and economic capital. Since not all studies included for data synthesis contained evidence on both learning experiences and participation consequences, this framework should not be understood as a causal link between the interventions and consequences. Instead, it configured a diverse set of themes identified from all evidence. Recognizing the complex and diverse nature of included TVET interventions, this review provided a comprehensive account of young people’s experiences rather than compared across different types of interventions.

Strengths and limitations

This study is the first systematic review to qualitatively examine young people’s experiences of TVET participation in LMICs. Although the reviewers conducted a comprehensive search of bibliographic databases and grey literature, the search was limited to studies written in English. Due to the reviewers’ limited resources, the search of grey literature was constrained to key gateways and organization websites. This review revealed a wide range of participants’ learning experiences and participation consequences apart

from economic outcomes that previous quantitative meta-analyses focused on. However, due to its qualitative nature, the review was not able to ascertain any causal relationship between interventions and consequences. This review also identified a set of contextual factors that shaped young people's experiences. However, due to limited evidence, the reviewers were not able to include other factors, such as macro-economic factors, which are critical to understand the impact of TVET.

Implications for research

More research is required to evaluate the comprehensive impact of TVET on its participants and to understand factors that shape participants' diverse experiences in the developing context. Future empirical studies can leverage this review's findings as a starting point to identify key domains of TVET's impact relevant for local contexts and employ a longitudinal and rigorous design to establish any association. Comparative studies should be conducted to identify effective components of different TVET types and contextual factors contributing to participants' positive experiences. More focused evidence is also needed to understand the experiences of the most disadvantaged participants.

Implications for practice

Findings of this study suggest a mixed picture of TVET's multi-dimensional impact. To enhance participants' overall experiences, practitioners not only need to ensure the intervention quality, but also need to cultivate a supportive physical and interpersonal learning environment. They should also understand and address the diverse needs of different learners, especially the most vulnerable groups, to maximize the potential of TVET for all. Furthermore, this review demonstrates that participants' perspectives and feedbacks are informative and instrumental in assessing and improving TVET, which should be taken into considerations into the full intervention cycle from design, implementation to evaluation.

Conclusion

This qualitative review found that TVET participation had a comprehensive and profound impact on young people's development and wellbeing in LMICs in terms of cultural capital, social capital, aspirations, and health, beyond economic and work-related consequences that previous quantitative reviews focused on. Participants' mixed experiences were the result of the interaction among multiple factors, including intervention features and quality, learning environment, individual characteristics, and social norms. To improve participants' overall outcomes, an integrated approach should be taken to address all these factors. Findings also suggest that TVET participation was particularly beneficial for the most disadvantaged youth, which underscored the potential of TVET to widen educational access and promote social equity. More rigorous empirical research is needed to establish the association between TVET and participants' multi-dimensional outcomes and to understand the mediation effects of conversion factors.

Appendix 1: Search terms of key concepts

KW1: TVET

- 1) TVET or "technical education" or "technical training" or "tech* prep*" or "technician education" or "technical stud*" or "technical cent*" or "technical school*" or "technical course*" or "technical program*" or "technical college*" or "technical degree*" or "technical diploma*" or "technical qualification*" or "vocational education" or "vocational training" or "vocational stud*" or "vocational retraining" or "vocational work experience" or "vocational cent*" or "vocational school*" or "vocational course*" or "vocational program*" or "vocational college*" or "vocational degree*" or "vocational diploma*" or "vocational qualification*" or "industrial education" or "industrial training" or "apprenticeship*" or "traineeship*" or "day release" or "trade course*" or "job training" or "job-related training" or "job-site training" or "in-service training" or "retraining" or "training program*" or "skill* training" or "skill* development program*" or "skill* development training" or "skill* development cours*" or "staff development program*" or "work* learning" or "work place learning" or "work based learning" or "work related learning" or "work* education" or "work place education" or "work based education" or "work related education" or "work* training" or "work place training" or "work based training" or "work related training" or "work* program*" or "work place program*" or "work based program*" or "work related program*" or "work experience program*" or "workforce development intervention*" or "workforce development program*" or "labour market program*" or "labor market program*" or "labour force development" or "labor force development" or "employment based education" or "employment based training" or "employ* training" or "employ* education" or "employ* development program*" or "employ* program*" or "employ* course*" or "unemploy* training" or "training for unemployed" or "training for the unemployed" or "occupation* education" or "occupation* training" or "occupation* program*" or "occupational home economics" or "occupation* course*" or "cooperative education" or "farmer education" or "agricultural education" or "agricultural training" or "business education" or "business training" or "entrepreneurship training" or "office occupations education" or "contract training" or "school to career program*" or "school to work program*" or "career* education" or "youth program*" or "company training" or "company-based learning" or "investment in training"

KW2: youth

- 2) "youth" or ("young adult" OR "young adulthood" OR "young adults") or "young people" or "school leavers" or "at-risk youth" or "disadvantaged youth" or "underprivileged* youth" or "dropout*" or "out-of-school" or "young women" or "young men"

KW3: qualitative and mixed-methods studies

- 3) (qualitative OR "qualitative research" OR "qualitative study" OR "mixed-method*" OR "mixed method*" OR "descriptive research" OR ethnography OR "ethnographic research" OR "ethnological research" OR narrative* OR "case study" OR "case stud-

ies” OR “action research” OR “participatory research” OR (qualitative AND evaluation) OR “grounded theory” OR phenomenolog* OR “feminist research” OR “naturalistic inquiry” OR interview* OR “focus group*” OR (qualitative AND survey*) OR observations OR “observational analysis” OR “participant observation” OR “non-participant observation” OR audiorecording OR videorecording OR “audio recording” OR “video recording” OR “case management” OR “case file review*” OR “document collection” OR “website identification” OR meta-synthesis OR metasynthesis OR “systematic review”)

“perception*” or “experience*” or “perceive*” or “view*” or “perspective*” or “insight*” or “viewpoint*” or “point of view*” or POV or standpoint* or position* or stand* or stance* or attitude* or interpretation*

KW4: low- and middle-income country (World Bank 2019)

- 4) (Africa or “sub Saharan Africa” or “North Africa” or “West Africa” or “East Africa” or Algeria or Angola or Benin or Botswana or “Burkina Faso” or Burundi or “Cabo Verde” or Cameroon or “Central African Republic” or Chad or Congo or “Democratic Republic of the Congo” or “Republic of the Congo” or “Cote d’Ivoire” or “Ivory Coast” or Djibouti or “Egypt” or “Equatorial Guinea” or Eritrea or Ethiopia or Gabon or Gambia or Ghana or Guinea or “Guinea-bissau” or Kenya or Lesotho or Liberia or Libya or Madagascar or Malawi or Mali or Mauritania or Morocco or Mozambique or Namibia or Niger or Nigeria or Rwanda or “Sao Tome” or Principe or Senegal or “Sierra Leone” or Somalia or “South Africa” or “South Sudan” or Sudan or Swaziland or Eswatini or Tanzania or Togo or Tunisia or Uganda or Zambia or Zimbabwe)
- 5) (“South America” or “Latin America” or “Central America” or Argentina or Bolivia or Brazil or Colombia or Ecuador or “El Salvador” or Guyana or Mexico or Paraguay or Peru or Suriname or Venezuela or “Costa Rica” or Guatemala or Honduras or Nicaragua)
- 6) (Caribbean or Belize or Cuba or Dominica or “Dominican Republic” or Grenada or Haiti or Jamaica or “St. Lucia” or “Saint Lucia” or “St. Vincent and the Grenadines” or “Saint Vincent and the Grenadines” or “St. Vincent” or “Saint Vincent”)
- 7) (“Eastern Europe” or Balkans or Albania or Armenia or Belarus or Bosnia or Herzegovina or Bulgaria or Moldova or Kosovo or “North Macedonia” or Macedonia or Montenegro or Romania or Serbia or Ukraine)
- 8) (Asia or “Middle East” or “Southeast Asia” or “Indian Ocean Island” or “South Asia” or “Central Asia” or “East Asia” or Caucasus or Afghanistan or Azerbaijan or Bangladesh or Bhutan or Cambodia or China or Georgia or India or Indonesia or Iran or Iraq or Jordan or Kazakhstan or Korea or “Kyrgyz Republic” or Kyrgyzstan or Lao or Laos or Lebanon or Malaysia or Maldives or Mauritius or Mongolia or Myanmar or Nepal or Pakistan or Russia or “Russian Federation” or Philippines or Uzbekistan or Vietnam or Thailand or “Sri Lanka” or “Syrian Arab Republic” or Syria or Tajikistan or Timor-Leste or Timor or Turkey or Turkmenistan or “West Bank” or Gaza or Yemen or Comoros)
- 9) (“Pacific Island*” or “American Samoa” or Fiji or Kiribati or “Marshall Islands” or Micronesia or Nauru or “Papua New Guinea” or Samoa or “Solomon Islands” or Tonga or Tuvalu or Vanuatu)

10) ((developing or less-developed or “less* developed” or “under developed” or under-developed or under-developed or middle-income or “middle income” or “low income” or low-income or underserved or “under served” or deprived or poor*) AND (countr* or nation* or population or world or state* or economy or economies)) (“third world” or LMIC or L&MIC or “low and middle income countr*” or LAMIC or LDC or LIC or “lami countr*” or “transitional countr*” or “transitional econom*”)

Appendix 2: Quality Appraisal Tool

Quality assessment tool from Bangpan et al. (2017).

Quality criteria	Guidance and criteria for informing judgments
<p>QAQ 1: Were steps taken to strengthen rigor in the sampling?</p>	<p>Consider whether:</p> <ul style="list-style-type: none"> · The sampling strategy was appropriate to the questions posed in the study (e.g., was the strategy well-reasoned and justified?) · Attempts were made to obtain a diverse sample of the population in question (think about who might have been excluded who might have had a different perspective to offer) · Characteristics of the sample critical to the understanding of the study context and findings were presented (i.e., do we know who the participants were in terms of e.g., basic socio-demographics, and characteristics relevant to the context of the study?)
<p>QAQ 2: Were steps taken to strengthen rigor in the data collected?</p>	<p>Consider whether:</p> <ul style="list-style-type: none"> · Data collection was comprehensive, flexible, and/or sensitive enough to provide a complete and/or vivid and rich description of people’s perspectives and experiences (e.g., did the researchers spend sufficient time at the site/with participants? Did they keep following up? Was more than one method of data collection used?) · Steps were taken to ensure that all participants were able and willing to contribute (e.g., processes for consent –language barriers, power relations between adults and children/young people)
<p>QAQ3: Were steps taken to strengthen the rigor of the analysis of data?</p>	<p>Consider whether:</p> <ul style="list-style-type: none"> · Data analysis methods were systematic (e.g., was a method described/can a method be discerned?) · Diversity in perspective was explored · The analysis was balanced in the extent to which it was guided by preconceptions or by the data · Quality analysis in terms of inter-rater reliability/agreement · The analysis sought to rule out alternative explanations for findings (in qualitative research this could be done by e.g., searching for negative cases/exceptions, feeding back preliminary results to participants, asking a colleague to review the data, or reflexivity)
<p>QAQ4: Were the findings of the study grounded in/ supported by the data?</p>	<p>Consider whether:</p> <ul style="list-style-type: none"> · Enough data is presented to show how the authors arrived at their findings

Quality criteria	Guidance and criteria for informing judgments
QAQ5: Please rate the findings of the study in terms of their breadth and depth	<ul style="list-style-type: none"> · The data presented fits the interpretation/supports the claims about patterns in data · The data presented illuminates/illustrates the findings · (For qualitative studies) quotes are numbered or otherwise identified and the reader can see they do not come from just one or two people <p>Consider whether (NB it may be helpful to consider 'breadth' as the extent of description and 'depth' as the extent to which data has been transformed/analyzed):</p> <ul style="list-style-type: none"> · A range of issues are covered · The perspectives of participants are fully explored in terms of breadth (contrast of two or more perspectives) and depth (insight into a single perspective) · Richness and complexity have been portrayed (e.g., variation explained, meaning illuminated) · There has been theoretical/conceptual development
QAQ6: Privileges participants' perspectives/ experiences?	<p>Consider:</p> <ul style="list-style-type: none"> · Whether there was a balance between open-ended and fixed response questions · Whether participants were involved in designing the research · Whether there was a balance between the use of an a priori coding framework and induction in the analysis · The position of the researchers (did they consider it important to listen to the perspectives of children?) · Whether steps were taken to ensure confidentiality and put young people at ease
Reliability (rigor) and usefulness QAQ7: Reliability	<p>Guidance: think (mainly) about the answers you have given to questions 1–4 and rate studies as: low reliability, medium reliability, high reliability</p>
QAQ8: Usefulness	<p>Guidance: think (mainly) about the answers you have given to questions 4–6 above and consider: the match between the study aims and findings and the aims and purpose of the synthesis and its conceptual depth/explanatory power. Rate studies as low usefulness, medium usefulness, high usefulness</p>

Abbreviations

ICT	Information and communication technology
LMIC	Low- and middle-income country
NGO	Non-governmental organization
PRISMA	Preferred Reporting Items for Systematic Reviews and MetaAnalyses
PROSPERO	The International Prospective Register of Systematic Reviews
TVET	Technical and vocational education and training
UNESCO	United Nations Educational, Scientific and Cultural Organization

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Author contributions

YS conceptualized, developed the methodology, and performed all review stages, and was the major contributor in writing the manuscript. MB supervised all review stages, supported and validated evidence synthesis and findings, and reviewed and edited the manuscript. Both authors read and approved the final manuscript.

Authors' information

YS is a PhD candidate, based at the Department of Education, Practice and Society, Institute of Education, University College London. MB is an associate professor, based at EPPI-Centre, Social Research Institute, Institute of Education, University College London.

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