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BRITISH COUNCIL

The role of tertiary education in development

A rigorous review of the literature completed for the British Council

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International
Higher Education

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The inclusion of tertiary education in the Sustainable Development Goals is recognition of the potential role of post-compulsory education in global development.

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This study presents the results of a rigorous review of the nature, scope and strength of research evidence regarding the role of tertiary education in development in low- and lower-middle-income countries.

Acknowledgements

We are extremely grateful to staff at the British Council who have overseen and supported our work producing this report. First and foremost, our thanks to Michael Peak for all his guidance, kindness and astute commentary throughout the process of research and writing up. His understanding and sustained engagement with us through the phases of the work has substantially contributed to the range of the review and the depth of the analysis. We would also like to thank other colleagues at the British Council who participated in the Advisory Board for the study and shared their insights and feedback at different stages of the review. These are Alison Baily, Mike Solly, Chris Cooper, Mark Herbert, Kate Joyce, Brenda Giles, Liz Dempsey, Susanna Carmody, Christine Wilson and Dan Shah.

A rigorous review requires many complementary skills, and we appreciate the attention to many complex details given in early stages of the review by the research associates who worked with us on the initial searching and coding of the literature: Dr Nozomi Sakata and Dr Oliver Mutanga, and Xiaomin Li who assisted with other research tasks. Our review methodology was underpinned by the work of the EPPI-Centre at University College London, Institute of Education. Our thanks to Melissa Bond and other members of the EPPI team for their support throughout the research process. Lastly, our thanks and appreciation to Professor Tristan McCowan for his careful and insightful reading of the report at various stages,

his critical comments and his engagement with some of the ideas we have explored through this study.

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Foreword

The British Council builds connections, understanding and trust between people in the UK and other countries through arts and culture, education and the English language. We promote cultural relationships and support education, cultural, scientific and technological co-operation with the UK. Our research and policy insight work produces useful new knowledge to support this mission, to help to inform policy, our partners and our own programmes for the UK and with more than 100 countries in which we work.

The British Council has been active in international higher and vocational education for over 80 years as part of our contribution to sustainable development and to making the UK a force for good in an uncertain world. Our work includes global convening of education leaders; supporting partnerships between institutions and systems; working with universities and governments in the UK and in other countries to help students to access quality education; and facilitating international research collaboration to build capacity and capability in partner countries. We look to harness the UK's strongest cultural assets – such as world-class universities, science and research, arts, culture and an open society – as the areas where we as a country have the most to offer to global partnerships and development contribution, and where we can learn from others through international collaboration.

The inclusion of tertiary education (TE) in the Sustainable Development Goals (SDGs) is recognition of the potential role of post-compulsory education in global development. Many stakeholders, policymakers and institutions involved in international education and sustainable development believe in the power of TE to positively transform various aspects of life and society, but what evidence exists to back such claims?

The 2014 report *The impact of tertiary education on development* (Oketch, McCowan & Schendel) reviewed evidence in this space up to 2012, but the subsequent eight years have passed with limited further assessment of whether and how TE may be impacting on sustainable development. These years have seen significant increases in TE enrolment in many developing countries, new research into TE including much from developing countries, and the increasing salience of global challenges which require new knowledge, high-level skills and the conditions for international co-operation.

To address this gap, in early 2020, the British Council commissioned the Centre for Education and International Development (CEID) at UCL Institute of Education to conduct a rigorous review of the evidence of the role of TE in development in low- and lower-middle-income countries, and I am delighted to present this study here.

The work led by Dr Colleen Howell at CEID explores areas including the various functions of TE; the potential development outcomes of TE (including both economic and non-economic development outcomes); and the nature of evidence, and provokes intriguing discussion points around the importance of context, collaboration and alignment.

The analysis of CEID leads to recommendations for researchers, institutions and policymakers, including a focus on priorities for areas of research where additional evidence could make the largest contributions to development.

Understanding what works, for whom, where and when (and what could work better) will enable better decisions to be made. This study provides the global education community with this understanding, and it is our shared responsibility to act on it.

Dan Shah
Director Research, British Council

Executive summary

This study presents the results of a rigorous review of the nature, scope and strength of research evidence regarding the role of tertiary education (TE) in development in low- and lower-middle-income countries (LLMICs). Development is understood in terms of economic and non-economic outcomes, and TE as constituted by systems and institutions providing formal education beyond secondary school.

Four core functions of TE are identified – teaching and learning, research, innovation, and engagement – which contribute, directly or indirectly, on their own or in combination, to nine development outcomes:

1. graduate skill and knowledge
2. enhanced professional knowledge and skill among all workers
3. economic growth
4. poverty reduction and development of sustainable livelihoods
5. equitable relationships
6. new knowledge that contributes to technical and social innovation
7. strengthened and transformed institutions
8. strengthened basic education provision
9. a strong and engaged civil society.

TE may contribute to positive development outcomes, misaligned processes which do not meet the intended outcomes or may have mixed effects.

A total of 2,849 studies published from 2010 were identified through an initial search of selected databases. Further screening with regard to country context and focus on TE established a refined list of 1,434 studies for consideration in the review. These studies were mapped according to the regional and country context and the development outcome(s) explored. A further set

of criteria screened the studies for evidence of the relationship between TE and one or more of the development outcomes. A final set of 170 studies was analysed.

It was noted that a majority of studies used quantitative methods, that the existence of a standardised methodology for conducting studies of economic growth had contributed to this comprising the largest segment of the research, and that there were more studies conducted in lower-middle-income countries than low-income countries – although this may be associated with this review dealing only with studies published in English.

Main themes emerging from the analysis of the evidence were:

• Economic growth and enhanced earnings for graduates are crucial development outcomes associated with TE. Although some of the evidence highlights that aggregate economic growth is not well distributed and that the income benefits of participating in TE tend to go to groups that are already established in dominant political and economic positions, the evidence as a whole points in a positive direction, associated with national economic growth, regional development initiatives, increased labour market opportunities and earnings for graduates, and skill enhancement that contributes to productivity.

• Many studies in this review highlight a 'mismatch' or misalignment between the skills and knowledge of graduates and the needs of the labour markets in LLMICs. Although the nature and scope of this 'mismatch' may differ slightly across countries and regions, attention is often drawn to the curriculum within TE institutions and the extent to which it is not adequately providing graduates with the skills and knowledge that are needed for their country's development.

• Poverty reduction does not present as a directly intended outcome of TE. However, there is some evidence to show that participating in TE may increase lifetime earnings or entrepreneurial activities of groups who were born poor. A small body of evidence shows that under certain conditions TE's capacity to provide technological or managerial support can be oriented to addressing aspects of poverty, which can have beneficial results.

• The evidence that provides insight into the role of TE in the creation of equitable relationships suggests that TE contributes positively in a number of different ways to enhancing quality of life, both for those who participate in it and through the influence of its graduates. However, the evidence also suggests that there are a number of ways in which TE may maintain hierarchies and exclusions, and may be complicit in relations of violence, thus reinforcing or deepening existing inequalities.

• Technological and social innovation do not currently happen at a maximum in LLMICs because there is poor connectivity between TE and the knowledge needs of a country, community or society, be they in relation to health, environmental problems, industrial development, or enhancement of ICT. The evidence considered in this review shows mixed outcomes, with many missed opportunities to connect well and align inputs, outputs and processes.

• The evidence shows that TE's role in strengthening basic education is primarily enacted through the provision of teacher education programmes and thus through its teaching and learning function. The evidence shows, however, that misalignment often exists between these programmes and teachers' practices in the classroom. This 'mismatch' is shaped by both

curriculum weaknesses and complex contextual factors that hinder the translation of what is learnt into meaningful practice.

• Tertiary education's role in enhancing professional knowledge, understanding and skill happens primarily through the teaching and learning functions of higher education and technical and vocational education and training (TVET) institutions, impacting across a range of sectors and involving a range of programmes and initiatives at different levels of post-secondary education. On the one hand, the evidence points to positive outcomes, mainly through innovative initiatives to enhance particular kinds of professional knowledge and skill, emphasising the importance of TE's role in the development of professional capabilities across LLMICs. However, it is also clear that a range of contextual factors undermine the capacity of TE systems to play this role effectively.

• The role of TE in strengthening and transforming institutions is strongly enabled by its participation within collaborative relationships and partnerships that are facilitated via its teaching and learning and engagement functions. However, a range of broader national and global inequalities affect the functioning of institutions, creating complex processes of change that need to be managed and grappled with.

• Although drawing from a small body of literature, the evidence in this review shows that TE plays (or has the potential to play) a very important role in strengthening and building the capacity of a vibrant and engaged civil society. Change is enabled via the kinds of knowledge and skills that graduates acquire and by the 'space' that institutions provide for forms of engagement and relationship building, especially in the context

of strengthening and building democracy. However, the evidence also shows that TE's relationship with civil society often involves managing complex processes and conflicting influences, all of which institutions and systems are required to manage.

On the basis of these findings the following recommendations are made:

• Taking account of the under-recognition of the importance of TE for development, initiate programmes and projects that comprise research, policy dialogue and practice initiatives, which recognise that **the role of TE in development is a two-way process**, involving a wide range of actors, relationships and institutions. Support more 'joined-up' and reflective processes of discussion and review of research, policy and practice between TE and other sectors to enhance the depth of insights gained and support a positive normative orientation for development outcomes.

• Develop in partnership with TE institutions and researchers in LLMICs a **comprehensive research programme** aimed at building a strong evidence base to inform policy and practice, sensitive to local contexts and needs. This research programme needs to be accompanied by a sustained and long-term programme of building research capacity and a research ecology. In planning a comprehensive research programme, the following research priorities are recommended:

– *studies that empirically explore TE's role in contributing to the full range of development outcomes*, particularly 'non-economic' ones and the interconnections between different development outcomes

– studies that explore how and why the *processes of change* between TE and development outcomes

may become misaligned or contribute to negative outcomes, and how a process of change that leads to positive development outcomes can be strengthened and sustained

– studies that seek to deepen understanding of the location of the *TE sector and particular institutions within a wider political, economic and socio-cultural context*, documenting the nature of the relationships between TE and other institutional formations, including development co-operation partners and how these support or hinder contributions to development outcomes.

• Promote the **use of a wide range of research methods** for studying the relationship between TE and development outcomes, supporting studies that triangulate different methods or apply comparative approaches to deepen insights and enhance validity.

• Strengthen the research capacity of LLMICs through the development of **strong and sustainable collaborative research partnerships and networks** across LLMICs and between LLMICs and other middle- or high-income countries, ensuring that these partnerships build a research ecology responsive to different voices and kinds of knowledge and able to generate research findings that are relevant and appropriate to local contexts and needs.

• Build and support projects, processes and systems for the **effective dissemination of research findings** on the role of TE in the development of LLMICs, ensuring that the evidence produced is used to strengthen policy dialogue and support practical local initiatives and change processes.

1. Introduction

This study presents the results of a rigorous analysis of the research evidence of the role of tertiary education (TE) in development in low- and lower-middle-income countries (LLMICs). The study was commissioned by the British Council and undertaken by a team from the Centre for Education and International Development (CEID) at University College London (UCL), Institute of Education (IOE). Tertiary education, as discussed in this study, encompasses a wide range of formal post-secondary institutions and associated systems. This includes, but is not limited to, universities, technical and vocational training colleges, business and medical schools, polytechnics and technical colleges, teacher training colleges, and two-year further education institutions.

The terms of reference (TOR) for the study set out a number of specific objectives that have guided the research process. These are:

- to update the rigorous review of evidence undertaken by Oketch, McCowan & Schendel in 2014 by adding to this picture through a consideration of evidence collected since this time and the identification of gaps from this review
- to consider both the economic and non-economic elements of development and their relationship with tertiary education
- to consider evidence of any link between TE and improving the capacity and capability of basic education

- to consider what evidence exists of the impact on development outcomes of international TE partnerships
- to analyse the evidence with a view to making recommendations that prioritise where research questions are tractable, where additional evidence could make the largest contribution to development, and where the British Council and the Department for International Development (DFID)[1] can most add value.

The research team developed a conceptual frame to inform the overarching research objective of the study, which was to explore and analyse evidence of the relationship (direct and indirect) between TE and development in LLMICs, considering the nature, scope and strength of this evidence and drawing conclusions that can be used to strengthen the role of TE in development.

The report is organised into seven parts. Chapter 1 introduces the study. Chapter 2 presents the conceptual framework that has guided the study, including the formulation of the research questions and the mapping of the literature. Chapter 3 explains the methodology that was followed in conducting the review and finalising the body of literature for analysis. Chapter 4 gives an overview of the evidence analysed through this review, and Chapter 5 synthesises this evidence. Chapter 6 briefly considers some additional elements

of the literature, including from studies that may not have been included as evidence in the review but which raised important issues with regard to understanding the relationship of TE and development and which add value to the broader concerns of the study. Chapter 7 presents the conclusions from the study and outlines some recommendations.

It is important to note that this review was commissioned before Covid-19. So while we explored up-to-date evidence to approximately February 2020, the review does not include anything emerging as a result of the pandemic and its evolving impact on education systems, societies, economies, governments and a range of institutions. It also does not consider what the evidence may mean for this changed context due to the Covid-19 outbreak.

1. In September 2020 DFID was dissolved and merged with the Foreign Office into a new Foreign, Commonwealth and Development Office. See www.gov.uk

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2. Conceptual framework

In this chapter we discuss the development of the conceptual framework that we have used to guide the review of the literature and inform the formulation of the research questions.

2.1 Building on previous studies

The starting point for the development of the conceptual framework was the project's TOR, which required us, among other things, to update the rigorous review of evidence undertaken by Oketch et al. in 2014. In taking forward this objective, our concern was to build on the conceptual thinking from that project and to update the analysis of evidence that had been published since that study was completed. The 2014 study aimed to explore the research evidence on 'the impact of tertiary education (TE) on economic growth and development in low- and lower-middle-income countries (LLMICs)' (Oketch et al., 2014: p. 9). The analysis presented by Oketch et al. (2014) was that while notions of 'economic growth' and 'development' are often used interchangeably and are inter-related, they had approached these as distinct concepts, emphasising in particular that:

> Development incorporates a wide range of desirable outcomes beyond strict improvement in GDP, including poverty reduction, increased income equality, improved health, literacy, access to high-quality primary and secondary education, civic participation, good governance and the protection of human rights (ibid.: p. 9).

This perception was a central starting point for our study, as our TORs were to explore the 'economic and non-economic' elements of development. We built on and expanded the definition of the economic and non-economic development outcomes we regarded as central to the relationship between TE and development.

We were influenced in our thinking by our recent work together on a project that looked at the public good role of higher education in Africa, Higher Education, Inequality and the Public Good (HEIPuG) (Unterhalter et al., 2019).[2] Our work on this project had alerted us to higher education's public good role, implicit in the notion of development outcomes, as requiring conceptualisations of 'instrumental' and 'intrinsic' dynamics (ibid.). This suggested that both the monetary and non-monetary development outcomes associated with higher education could be associated with instrumental pathways, which could lead to changes in relation to people, relationships and institutions beyond the higher education institution. Or they could be associated with an 'intrinsic' pathway, where change is enabled through the processes, relationships and forms of engagements within higher education institutions that can be connected to and influence other societal institutions and structures. This linked to the finding from the HEIPuG project that higher education could provide intrinsic 'spaces' that enabled relationships or perspectives that contributed directly or indirectly to development. Our assumption was that this understanding of higher education could also be applied to the broader field of TE.

These relationships or perspectives in their instrumental or intrinsic orientations may be in the form of 'straight' cognitive gains, including increases in information, knowledge and understanding, or non-cognitive aspects, including processes that are affective, dialogic, equitable and concerned with well-being and sustainability. We were aware that this is an area of considerable debate in the field of higher education studies (e.g. Nussbaum, 1998; Marginson, 2016; Collini, 2017; Willetts, 2017; Mamdani, 2019). However, for the purposes of our review we regarded both the 'instrumental' and 'intrinsic' in the relationship between higher education and the public good as important to our conceptual thinking. We therefore set out to develop a conceptual framework that would allow us to take the widest possible view of the instrumental and intrinsic ways in which the relationship between TE and development is enacted. This resulted in us identifying nine development outcomes, a slightly larger number than the Oketch et al. (2014) study. These development outcomes we suggest are important to the instrumental and intrinsic forms of the relationship between TE and development, and in selecting literature for the review we included both facets.

2. This project was funded jointly by the Economic and Social Research Council (ESRC) Newton Fund and the National Research Foundation (NRF), South Africa.

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A second element from the Oketch et al. (2014) study that we drew on was their emphasis on approaching the concept of 'impact' broadly, enabling them to explore research evidence that spoke to 'causal pathways between development outcomes and TE' (ibid.: p. 9). They recognised that while it is difficult to attribute a development outcome directly to TE, it is possible to explore research evidence of the 'link between TE and developmental change' captured in that review as 'pathways to impact'. We considered this emphasis on 'pathways' and 'change' to be especially important. Given that our TOR required us to explore the 'role' of TE in development, we have worked to consider the nature of the change enabled (or not) through this relationship. We have been interested in impacts or processes of change that are positive, negative, misaligned or mixed.

Our thinking here had been influenced by the HEIPuG project which drew our attention to the ways in which TE may function, sometimes directly and sometimes indirectly, to undermine positive normative outcomes associated with development (Unterhalter et al., 2019). For example, TE may be associated with the reproduction of social inequality and the political entrenchment of elites (Daloz, 2018). Negative impacts had been looked at by Oketch et al. in the 2014 study, but few instances were identified. Our HEIPuG study highlighted how contextual factors enable or constrain public good outcomes of higher education and the conditions that make the realisation of such outcomes possible (Unterhalter et al., 2019). We therefore moved from the premise that particular conditions

(operating at global, national, system, institutional, group and individual levels) enable or constrain the relationship between TE and development, taking the broadest possible understandings of both (Unterhalter et al., 2019). Our reflections on these issues were also deepened by McCowan (2019), who presents an analysis of the developmental university, emphasising the multiple understandings and processes associated with development outcomes. He points to the need to understand the difference between normative aspirations and change processes towards development outcomes.

We have been concerned to consider in this review what the research evidence may show us in relation to the nature of the change that happens through this relationship – what we referred to as the pathways to change. We wanted to be alert in the literature to the complex and multiple pathways through which the relationship between TE and development is enabled and enacted and to consider whether these pathways support changes that are positive, misaligned, negative or mixed. We also wanted to explore whether the evidence suggests that this relationship involves a simple set of linear drivers or if it involves more complex processes of change involving multiple actors, relationships, processes and practices. We set out to consider if the evidence may enable insight into contextual conditions that impact on and shape the change process. We regarded this form of engagement with the evidence as important to deepening our insights into where international development partners may add most value, especially towards strengthening

positive processes of change and enhancing the conditions that enable such change.

A third development from the analysis in the Oketch et al. (2014) study was to consider their conceptualisation of TE as having three 'central functions or 'pillars' (Oketch et al., 2014) through which the pathways to impact take place. Oketch et al. saw these pillars as being teaching, research and 'service', with the last of these largely being about the 'the engagement of institutions with the local community and broader society', through both their knowledge function and through direct service provision (ibid., citing Knight, 2004).

We decided to broaden this tripartite division slightly. We expanded the 'teaching' function to include 'learning', seeing these elements as inter-related and central to enabling (or hindering) the transformative potential of the curriculum in development (Walker, 2013). We retained the important research function of TE and added 'innovation' as an additional core function. Although research and innovation are often strongly linked, where research leads to new knowledge with innovative potential, we wanted to be alert to evidence that is concerned with the development through TE of ideas, practices and processes that may be short term, medium term and long term, sometimes associated with teaching and learning, sometimes with uses of technology or organisational form. There is a literature on innovation diffusion and higher education, which talks to these multiple relationships, not just based on research, and we wanted to be alert to literature that investigated this (Švarc & Dabić, 2017; Godin, 2019).

We also included 'engagement' as the fourth core function, expanding the notion slightly beyond the 'service' function identified by Oketch et al. (2014). Here we wanted to document how the engagement function of TE may go beyond its engagement with the broader local or national society to encapsulate evidence around 'inter-institutional engagement' through networks or partnerships and 'intra-institutional' engagement between different role players and stakeholders within TE institutions. Our assumption was that such forms of engagement may be important to an institution's capacity to contribute (or not) to development, and we wanted to be alert to this evidence in the review. While we regarded the conceptualisation of these four distinct functions of TE as necessary to understanding the pathways to change between TE and development, we were cognisant that the pathways that manifest through these functions may overlap and may therefore be less distinct than this initial sketch suggests.

2.2 A working framework for the coding and analysis of data

This process of building on the thinking in a number of previous studies resulted in the formulation of five research questions to investigate and the development of a conceptual framework that we used to guide the literature searches, coding and analysis of the evidence.

The research questions that informed the research process are:

1. What evidence is there in LLMICs of a relationship (direct or indirect) between the core functions of TE (teaching and learning, research, innovation, and engagement)

and a range of development outcomes that are economic and non-economic, public and private?

2. What research methodologies have been used to generate this evidence?

3. What is the scope of this evidence, what gaps exist and what conclusions can be reached about the strength of the available evidence?

4. What contextual factors enable or constrain the pathways to change between TE and the many faceted outcomes associated with development in LLMICs?

5. What evidence is there of how development outcomes may feed back to strengthen the capacity of TE?

Our framework was premised on the understanding that TE takes various forms. We therefore considered a working definition of TE as systems and institutions providing formal education beyond secondary school. This encompassed university education, post-secondary technical and vocational education and training (TVET) provided through institutions offering formal qualifications, and professional training leading to a professional or vocational qualification such as that offered through business and medical schools, polytechnics and technical colleges, teacher-training colleges, and two-year further education institutions.

In line with our thinking on the broadness and complexity of development and its relationship to TE, we conceptualised the four core functions of TE as contributing through pathways of change to nine development outcomes.

These development outcomes, while presented as distinct in the conceptual framework, may overlap, with TE contributing to any number of these through, for example, its teaching and learning function or any combination of other functions. Below we outline these nine development outcomes and the main issues that we surmised would inform the evidence on development's relationship with TE.

Graduate skill and knowledge

This outcome is associated with the levels or kinds of knowledge and understanding, including technical expertise and attributes or values, that graduates may acquire through their study. Positive outcomes are associated with the learning gains of those who have participated in TE and the impact that this may have at the individual, family and broader societal level, especially through economic, cultural, health or political relationships. Misaligned outcomes may be associated with a mismatch between this learning and the needs of the individual, family or broader society.

Enhanced professional knowledge, understanding and skill among all workers

This outcome includes enhanced knowledge, understanding and skill – possibly gained through participating or working in TE or through the innovations and engagements associated with TE – that are important to the development and well-being of the society and have a strong orientation to the service of the society. Important examples are the knowledge, skill and understanding of teachers (at all levels), health workers (in a range of settings), technicians, managers and public servants.

But this category also includes administrators and manual workers employed both inside and outside TE, who are not graduates, who gain knowledge through initiatives linked to TE. Evidence may point to the ways in which TE is contributing to such knowledge, understandings and skill, but it may also point to the ways in which this knowledge, skill and understanding may be restricted, irrelevant, misaligned or inadequate to meet local needs or respond to particular contexts.

Economic growth

This category of outcome captures the relationship between TE and the economic growth of a society. Evidence of this relationship may be associated with increases in GDP, employment or unemployment, levels of productivity, distribution and form of the labour market and levels of earnings. Crucial here is the extent to which the evidence may provide insight into how equitable or inequitable such growth is and in what ways TE may contribute to enhancing equity and sustainability or entrenching inequalities and using resources beyond the limits of the planet. For example, evidence may establish whether the benefits of growth are lodged with small elites or more widely distributed, whether there are gender, regional, race, ethnic or disability inequities around distribution and how they link to concerns around sustainability and 'green growth'.

Poverty reduction and development of sustainable livelihoods

This development outcome is concerned with the connections or disconnections between TE and poverty reduction. In addition to evidence that may speak directly to the relationship between TE programmes and poverty reduction, evidence here may also provide insight into how TE may contribute to understanding and supporting the struggles of those contending with poverty and the creation of opportunities or pathways towards well-being, agency, equity and sustainability for these groups. Equally it may point to ways that TE fails to do this.

Equitable relationships

This outcome concerns equitable relationships within society and how TE may develop, influence and shape these. Important examples here are those around gender equality, or those that support and sustain a human rights culture, address injustice, and promote social and political stability, including challenging and changing intersecting inequalities. Evidence considered here will speak to the extent to which TE may contribute in various ways to either building these relationships or destabilising or destroying such relationships, for example through the promotion of ethnic divisions or the promotion of detached elites.

New knowledge that contributes to technological and social innovation

This development outcome speaks to the role TE plays in the creation of new knowledge through research and innovations, involving the application of this knowledge to technological advancements, organisational development or social improvements. Evidence explored here may also point to what may weaken this pathway in LLMICs or be misaligned with regard to development outcomes, including through possible forms of harm that this relationship may contribute to, such as mass surveillance or the development of destructive weapons systems.

Strengthened and transformed institutions

This development outcome considers the role of TE in strengthening (or undermining) the ways in which institutions work to support all sectors of society, enhance accountability and transparency, and deliver knowledge, information and services. Important to this pathway is evidence of initiatives that feed back into the strengthening of TE and other institutions and the building of their capacity to contribute to society in this way.

Strengthened basic education provision

This outcome captures the relationship between TE and the basic education system. This may be a direct relationship, for example, through the training of teachers and other education personnel or through collaborations between TE institutions and schools, including through curriculum development or leadership enhancement. Evidence here may also speak to the inadequate or misaligned roles of TE in relation to the basic education system, for example, through poor-quality or misaligned pre-service teacher training, or where research may undermine education provision that meets the needs of all.

Strong and engaged civil society

This development outcome is focused on the ways in which TE may support (or potentially undermine) the growth of an informed and engaged civil society concerned with supporting human rights, needs, well-being, capabilities and development. Evidence considered here may speak to the experience of TE as facilitating such support or the perceived 'public intellectual' role of tertiary institutions and how or whether this role can or cannot be enacted.

Our final task in the process of conceptualising our map of the literature was the development of a visual representation of the conceptual framework that would capture the understandings we had reached and

would guide us through the review process, especially around the coding and analysis of the literature. Figure 1 captures the final conceptual frame for the study.

It shows on the left-hand side as a starting point that TE institutions, the people that work and study in them, and the systems that support them are located in a context that will enable and constrain their contribution to development. These contextual conditions are partly features of earlier historical development processes and their relationship to the present conjuncture. They are mostly structural in nature and operate at the system, institutional, group and individual levels, often enabling or constraining change in complex ways.

Within this context TE systems and institutions function through the four core functions we outlined above, with Figure 1 suggesting through the dotted lines separating them that these may overlap. On the right-hand side are the nine development outcomes that we perceive as most important to the role of TE in development, both economic and non-economic, and which may be of a public and private nature. We recognise, as McCowan (2019) has argued, that the impact of such change may happen in complex ways and may be understood in a multitude of ways.

The pathways to change between TE and these development outcomes are captured through the central arrow

and the smaller lines reaching out to each of them. Figure 1 emphasises through the dotted nature of these lines a relationship of change between TE and the outcomes that are directed towards them but may not cause them. The dotted lines also depict our assumption that the pathways to change from TE to the development outcomes may be complex as well as simple and linear. The depiction of the development outcomes surrounded by a dotted border emphasises that they may overlap and the parameters between them are often fluid. The nine development outcomes are each presented as having a dark and light fill, emphasising that the outcome of the relationship between TE and development may be conceived of as normatively desirable, but in practice the change may be misaligned or negative, leading to a mixture of implications for development.

In conclusion, it is important to note here that the conceptual framework for the study depicted in Figure 1 was formulated at the beginning of the review to guide the research process. We were aware that in the process of conducting the review new insights may emerge that could shift our thinking. We discuss in Chapter 7 any changes that our analysis of the literature made to this initial conceptualisation.

Figure 1: The conceptual framework for the study
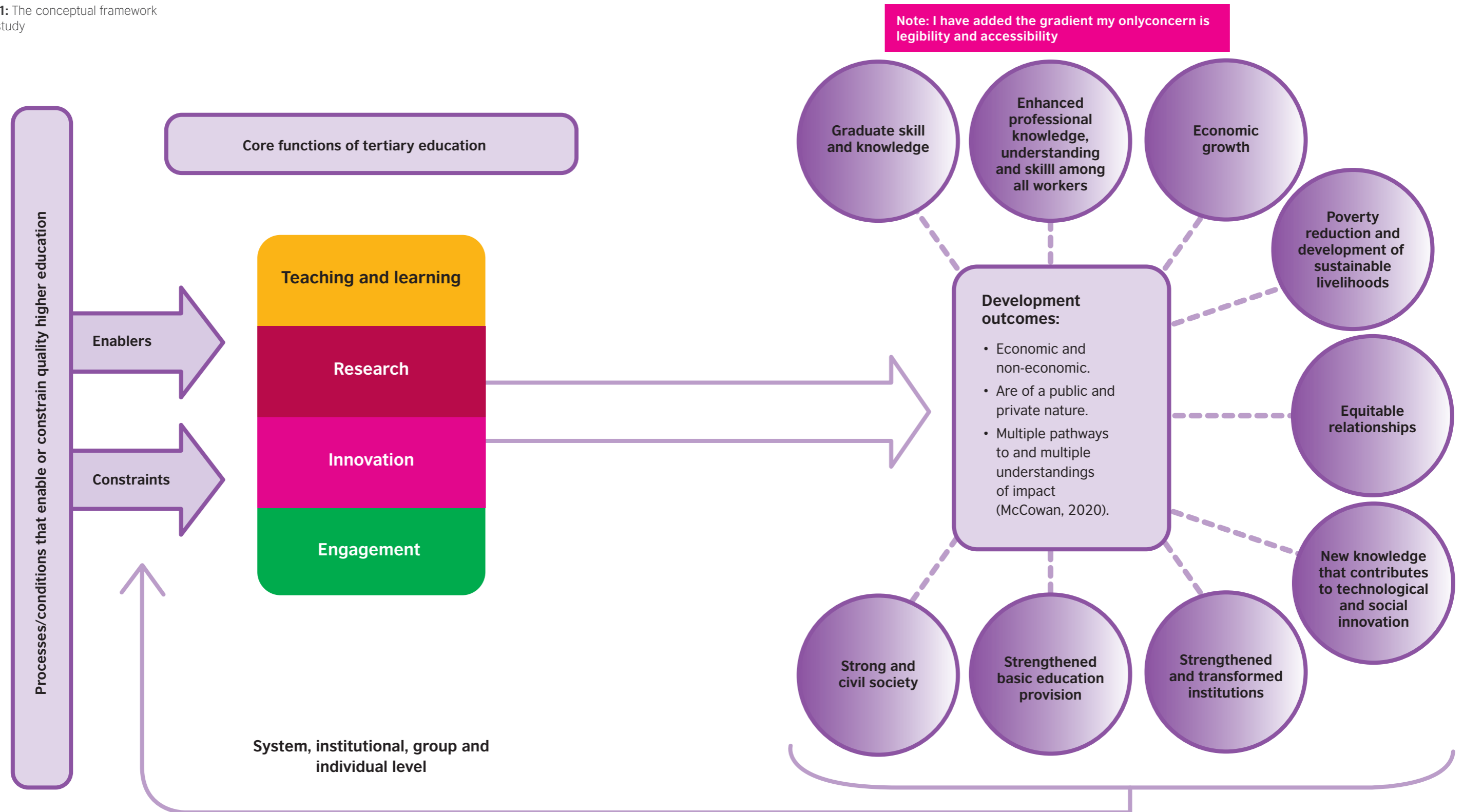
3. Methodology

This literature review was approached and undertaken as a 'rigorous' review, where we 'followed the principles of systematic reviewing, while allowing for the incorporation of evidence that might not pass the stringent standards of a full systematic review' (Oketch et al., 2014). We describe below the process followed in collating the 'evidence base', and the criteria used either for excluding studies not relevant to the study or for including studies for analysis and further synthesis. The EPPI software[3] enabled us to systematically screen and code the literature, allowing for clear steps of analysis in relation to our research questions.

3.1 Searching the literature

The first phase of the study involved searching databases to identify the widest possible range of literature for inclusion in the review. Our definition of LLMICs used the list of LLMICs and regions drawn up by the World Bank (see Appendix 2). Two assumptions guided our approach. The first was recognising that, while the distinct focus on LLMICs created very clear parameters for the geographical focus of the literature (the contextual focus), how we searched around the core concepts of 'tertiary education' and 'development' presented some challenges. As set out in the conceptual framework, our approach entailed understanding both these concepts as fluid and expressed in the literature through a range of terms. The 'unit of analysis' that needed to be explored, i.e. 'tertiary education', is defined and understood in different ways across different contexts (Unterhalter et al., 2019), including across LLMICs. Similarly, our fairly broad understanding of the notion of development, as

'economic' and 'non-economic' and evidenced through the nine outcomes set out in the conceptual frame, meant identifying the literature that spoke to the relationship between TE and development in a myriad of ways, including what enables or hinders this relationship. We therefore set out to search databases using a range of terms and combinations of these that could elicit the identification of relevant literature. The list of search terms and search strings used is included in Appendix 3.

A second assumption for our search was that we would review literature from as wide a base of evidence as possible. Thus the search process would need to move beyond an exploration of mainstream databases and mine other, less prominent sources that are important to research in many LLMICs. However, the relatively short time available for the review and the conditions of work during the Covid-19 crisis, with university libraries closed, meant we could only access literature available online, mainly through online university repositories, open access knowledge platforms or organisational websites, thus excluding contributions that are not in digital form. We acknowledge that this constitutes an important but inevitable limitation for the review. The online databases, platforms or websites explored are listed in Appendix 3.

The research team developed a research guideline with a list of the search terms and the filters we would use to establish an initial set of studies for possible review. This guideline is included in Appendix 3. The first set of references collated through these searches was then uploaded into a

newly constituted database for the review. Using the EPPI software, a first level of engagement with these titles was undertaken to 'clean' the data by excluding any references that did not meet the basic parameters for the review. These parameters included publications since 2010 published in English. While Oketch et al. (2014) used 2012 as the cut-off date, we chose a slightly earlier start date of 2010. We recognised that from that period there has been a widening concern in global policy discussion around seeing education phases as connected and which were to result, among other things, in expanding the Sustainable Development Goal (SDG) targets beyond school education, giving a central role to TE (Unterhalter, 2019).

This 'cleaning' process resulted in the team identifying a list of 2,849 works published between 2010 and February 2020 for further screening.

3.2 Mapping the literature on title and abstract

The abstracts of the studies in the initial database were reviewed to exclude literature that did not meet one or more of three criteria for inclusion in the review. While some of these criteria had formed part of the initial filtering process (e.g. an LLMIC), further checking was needed drawing on the additional information provided by the abstract for the study.

A further process of screening the 2,849 references was therefore undertaken to exclude contributions if they did not meet all of the criteria outlined below.

- The study dealt with at least one LLMIC (see Appendix 2) (contextual focus).

- The study dealt with TE (as defined for the review).
- The study was published in English.
- The study was conceptually relevant to the review and its objectives (conceptual focus). It was recognised that establishing whether a contribution was conceptually relevant was a complex process. Drawing from the conceptual framework, we constructed the following set of sub-criteria to further guide the process of inclusion/exclusion in the review. The contribution was considered conceptually relevant to the review if it:
  – explored in some way the *relationship between* TE (any facet/component/aspect) and development (economic or non-economic). This could be expressed in the form of a role, contribution, impact or any other way in which this relationship might be articulated and may involve change at the individual, group, institution or system level
  – explored this relationship *explicitly* (e.g. the economic benefits of expanded science, technology, engineering and maths (STEM) provision in Ghana's higher education system) or implicitly (e.g. building critical citizenship through the decolonisation of the curriculum)
  – discussed *one or more of the development outcomes* set out in the conceptual framework. This relationship could be explored at the level of the individual, group, institution or system.

This screening process resulted in the exclusion of 1,313 references, and a refined list of 1,434 was established for consideration in the review.

An important consideration at this point in the process was recognising that there were many contributions in this revised list where it appeared from the abstract that the study was largely conceptual or reflective in nature with no, or a very limited, empirical base. However, as Oketch et al. (2014: p. 21) had similarly found, these works constituted contributions relevant to the broad concerns of the review and 'might offer useful information to support the final analysis' but 'did not provide any evidence in reference to the central research questions'. We were particularly aware that these contributions may offer valuable insights into the conditions that may enable or hinder a positive contribution of TE to development within LLMICs, a concern that we wished to consider in our analysis. Similarly, we were cognisant of the argument made by McCowan (2019: p. 260) that what constitutes 'evidence' to inform understandings of impact (in this case, the impact of TE on development) is informed by 'normative moral and political questions'.

With these reflections in mind we engaged with the 1,434 references in the database in two ways. Firstly, we 'mapped' this body of literature to see which LLMICs they covered (organised into their geographical regions)[4] and which development outcomes they were exploring and discussing in relation to TE. This involved a process of coding these references according

to their 'contextual focus', i.e. the region and country or countries discussed in each study, and their 'conceptual focus', i.e. the development outcome(s) explored. Secondly, we developed a working definition for determining whether the contribution could be considered as constituting 'evidence' for exploring our research questions. Before we began the more rigorous process of excluding studies that did not meet the evidence criteria, we mapped some broad features of this broad body of literature. This overview is presented below.

Figure 2: The geographical focus of the literature from the first level of coding (n = 1,434)

- 22% | Sub-Saharan Africa
- 2% | Middle East and North Africa
- 6% | European and Central Asia
- 0.4% | Latin America and Caribbean
- 33% | South Asia
- 27% | East Asia and Pacific
- 10% | Multi-LLMICs

Figure 3: The conceptual focus of the literature from the first level of coding[6]

- 16% | Graduate skill and knowledge
- 15% | Enhanced professional knowledge, understanding and skill among all workers
- 10% | Economic growth
- 7% | Poverty reduction and development of sustainable livelihoods
- 14% | Equitable and sustainable relationships
- 6% | New knowledge that contributes to technological and social innovation
- 21% | Strengthened and transformed institutions
- 5% | Strengthened basic education provision
- 2% | Strong and engaged civil society
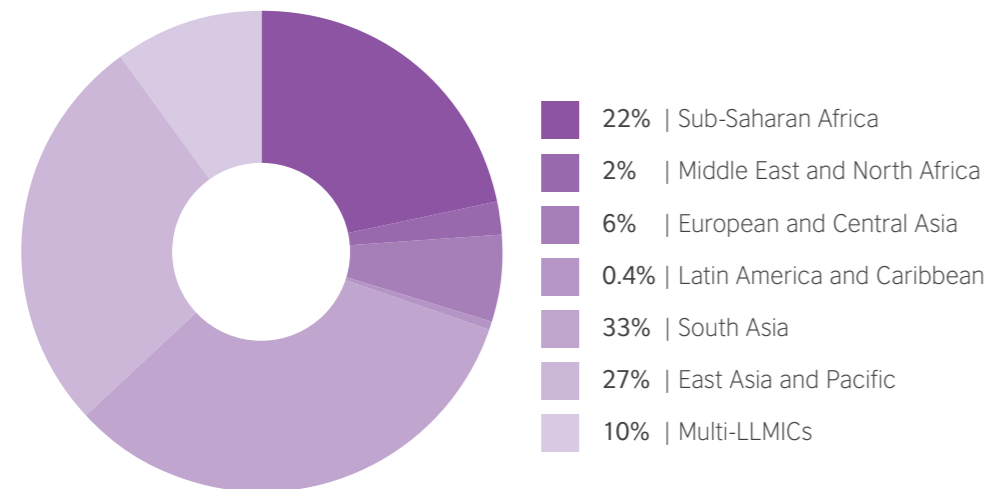- 4% | Other development outcome

Figure 2 shows the geographical focus of the literature from this first scan.[5] It can be seen that the largest number of studies focus on the countries of South Asia, followed by East Asia and the Pacific, and Africa. There are relatively few studies on the small number of LLMICs in Latin America, North Africa and the Middle East, and Europe and Central Asia. The category of 'multi-LLMICs' refers to studies that focus on countries across one or more of these regions. The South Asia region comprises the largest area of focus in this literature, but the largest proportion of studies here are of India (Table 4). India's participation as a BRICs (Brazil, Russia, India and China) country means it has been included in important studies on TE and development in the BRICs nations (see, for example, Carnoy, Froumin, Loyalka & Tilak, 2014 and Schwartzman, Pinheiro & Pillay, 2015).

This initial process of coding highlighted some interesting patterns in the developmental outcomes at this stage in the process. Figure 3 shows that while the conventional aspects of TE's relationship with economic growth are a relatively important component of this literature, development outcomes associated with the political and social aspects of development, such as strengthened and transformed institutions or equitable relationships, dominated the picture presented by the coding done at this stage of the review. This picture was to change, as the overview of the evidence presented in Chapter 4 shows.

The coding done at this stage of the review also showed that 'graduate skill and knowledge' and 'enhanced professional knowledge, understanding and skill among all workers' – both important outcomes of the teaching and learning function of TE – featured strongly as important focuses. At the same time, studies that addressed the research function of TE, captured conceptually as 'new knowledge that contributes to technological and social innovation', formed a relatively small part of the picture. At this stage of the review this reinforced the observation made by Oketch et al. (2014) that 'research intensiveness' may not be a feature of many TE institutions in LLMICs, or that it is not being systematically researched. However, the strongest development outcome evident at this stage was 'strengthened and transformed institutions', with 'equitable relationships' also having a relatively strong presence.
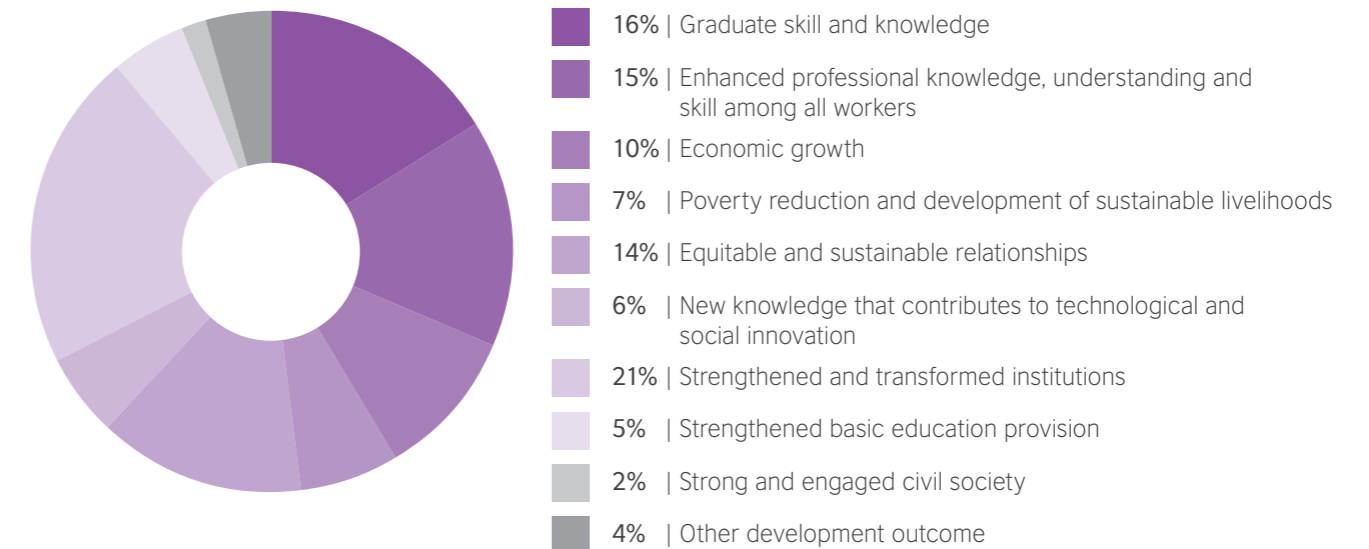
3.3 Finalising the evidence base

In reviewing this initial broad base of literature, which still contained a number of theoretical works, we developed a working definition for determining whether the contribution could be considered as constituting 'evidence' for exploring our research questions. Our approach was partly informed by Oketch et al.'s (2014) study, which excluded literature that did not demonstrate the use of empirical research in the examination of 'pathways to impact'. We followed this approach, but developed additional and slightly expanded criteria for rigour and inclusion, drawing on analyses of assessing evidence (Spencer, Ritchie, Lewis & Dillon, 2003; Nutley, Powell & Davies, 2013; Gough, 2016). In building

the evidence base for the final stage of the review, our overarching intention was to:

- include studies that contribute to building an evidence base on *the relationship* of TE to the development of LLMICs
- understand the relationship of tertiary education and development by considering the pathway to change between one or more of TE's core functions and the development outcome(s) documented in the study, and note the direction and modality of the change process
- take account of appropriate methods or explanatory frameworks that build knowledge of contextual conditions that enhance or undermine this relationship.

With these overarching considerations in mind, we undertook a further screening of the abstracts and, where necessary, the full manuscript of the 1,434 studies to finalise the list of studies that we would analyse as evidence. The following criteria were used to determine if the study met the evidence criteria for inclusion and to confirm our earlier determination that it was conceptually relevant to the concerns of this review.

- The topic covered in the work is substantially relevant to the concerns of the review and contributes to advancing wider knowledge or understanding about policy, practice or theory around the relationship of TE delivered in LLMICs and development outcomes.

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5. See Appendix 2 for a list of LLMIC countries and their regions (World Bank, 2019).

6. n is greater than 1,434 here as all the development outcomes explored in the contribution were coded, so a number of the studies would speak to more than one development outcome.

- Some form of research process is made explicit and underpins the study. In addition, the work meets at least one of the following criteria.
  - The research process involves empirical or non-empirical research where there is clarity around the research methods used and there is 'methodological fitness for purpose' (Rutter et al., 2010) – that is, the research design and methods used are clearly described, and the ways in which they are appropriate to addressing the research questions are clear (display 'internal validity'). When no empirical research is reported, the theoretical or disciplinary framework used will have been clearly described and discussed.
  - The context of the study (historical, locational, political, economic, social or cultural) has been clearly described.
  - The work has been subject to a process of peer review or the application of some form of external scrutiny.
  - The study, even if small in scale, demonstrates credibility around the claims that are made by offering well-founded and plausible arguments about the significance/ importance of the insights/findings generated.

Through this process 1,263 studies were excluded and a final list of 170 studies were selected for the final evidence base for detailed analysis.

In reflecting on this process, the main reasons for exclusion were that the studies excluded did not establish any evidence of a link with the development outcomes. In the process of screening it became apparent that in titles and abstracts many works asserted a link with development, but this link was not clearly researched and thus was not sufficiently clear from the evidence presented. It thus appears that one of the major areas of growth of scholarship in the last ten years has been description and investigation of the field of TE, but that far fewer works have actually researched links with development outcomes. Importantly, through this final process of screening, the early maps of the contextual and conceptual focuses of the literature changed quite sharply. The new picture that emerges from the finalised evidence base is presented in Chapter 4.

In this process of deciding on excluding works, we also noted a number of studies, often strongly conceptual in nature, that we considered important to understanding the role of TE in development. Some of these had informed the development of our conceptual frame but did not contain the evidence, as defined above, that was important for this review. We discuss some of the insights from these works that have added to our conclusions and recommendations in Chapter 6.

3.4 Analysing the evidence

In line with our conceptual framework and our concern with considering the pathways to change through which the relationship between TE and development is enabled or enacted, we developed a matrix for analysing the evidence (included in Appendix 3). We used this matrix to develop a second set of codes to further map the evidence in relation to the research methods used and the nature of the change pathway between TE and one or more of the development outcomes. We considered the direction of the change that was evident in the study (positive, misaligned or mixed), the modality of the pathway (linear or complex) and the core function of TE through which the change is enabled (or possibly restricted). Our analysis also considered any important contextual factors the study noted as important in impacting on this pathway.

Many of the studies coded dealt with more than one of the development outcomes we identified in our conceptual framework. To ensure that we did justice to this, but also recognising the limitations of time and capacity, we decided to analyse the pathways to change suggested by the evidence in relation to no more than two development outcomes. For example, a study on teacher education may report on TE's role in 'strengthening basic education' and in 'enhancing professional knowledge and skill among

all workers'. The pathways leading to (or restricting) these two development outcomes may have differences. Thus, if there were two development outcomes noted for a particular study, each was coded separately.

3.5 Limitations of the research process

We recognised at the beginning of the research process that language would be a crucial challenge limiting the range of literature included and the conclusions we reached. We recognised that only looking at the literature that had been published in English would limit the scope of the evidence, particularly with regard to research in countries where English is not the main language. Although we had hoped to be able to mitigate these through an exploration of literature published in other languages – French, Portuguese, Spanish and Chinese – unfortunately the time and resources available for the project did not allow us to expand the research process in this way. There may therefore be gaps in the literature identified, especially in relation to Latin America and the Caribbean, West Africa, Asia and Central Europe, as we have not yet been able to include for review detailed coding literature in these additional languages. Supplementing these findings with literature published in other languages will deepen the picture we present.

Our TOR required us to consider, as part of the review, evidence on the role of TE in strengthening basic education. In our initial search through databases we did not add any specific search terms related to basic education to expand our search beyond the terms described in Appendix 3. However, we did intentionally include for review any evidence that emerged through the initial scan on the role of TE in the training and development of teachers. When we began a close analysis of the final list of included studies, only eight studies showed evidence of the relationship between TE and basic education. We were concerned that while we were considering teacher education through a particular lens (see Section 5.6 in Chapter 5), there may still be important research on teacher education and other specific professional education that our initial search process had not elicited, but which was important for us to consider for the review. We therefore undertook a second search, adding a range of terms related to the professional education of teachers and health workers. Although this search did result in an increased number of studies that investigated the role of TE in supporting basic education and other forms of professional education, only eight studies met our evidence criteria. These additional studies were then included into our final evidence base of 170 studies.

We recognise that while this review suggests that the evidence on the role of TE in supporting basic education and the development of other professionals working in essential services across LLMICs is small, the process of scanning relevant databases may have been limited by the range of search terms we used to explore the literature. Broadening the search terms to include more specific ones related to a wide range of professions may elicit a larger body of literature.

We have designed this study as a rigorous, rather than a systematic, review. Thus, we have been rigorous and methodical in identifying and classifying the studies for inclusion, but we have not applied any criteria of rigour to the studies reviewed, including all those that met our criteria. Thus, there are a number of studies where the evidence base is not strong, and the study design does not allow for wider conclusions to be drawn. A number of studies with regard to skill mismatch and forms of professional knowledge have these characteristics. We return to this point in the conclusion, where we highlight the need for studies that triangulate by method and engage with the issue of validity in greater depth than has been done by a number of studies included in the review.

4. Overview of research evidence

The chapter presents a high-level overview of the evidence included for analysis in this review. It maps the 170 studies included in the review according to:

• the type of literature considered
• the research methods used in the studies
• the geographical focus of the studies

• the conceptual focus of the studies according to the nine development outcomes
• the core functions of TE considered in the studies
• the nature of the pathways to change between TE and the development outcomes, showing the direction of change and the modality.

The studies were organised into the type of publication in which the evidence was presented and discussed. Table 1 shows that most of the studies included in the review were published in academic journals.

Table 1: Type of literature (n = 170)

Type of literature	No. of studies
Journal article	138
Book chapter	10
Report	22

Table 2: Research methods used (n = 170)

Method		No. of studies
Quantitative	Survey report	25
	Application of statistical methods[7]	50
	Combination of more than one quantitative method	5
	Random control trial	1
	Sub-total	**81**
Qualitative	Interviews	19
	Historical policy analysis	4
	Case study	9
	Combination of more than one qualitative method	13
	Sub-total	**45**
Mixed	Quantitative survey and qualitative method	33
	Application of statistical method and qualitative method	4
	Sub-total	**37**
Rigorous review		7
	Total	**170**

Table 2 shows that a large proportion of the evidence included in this review was collected through quantitative methods. Many studies were based on the application of statistical methods to existing datasets such as household surveys or labour force surveys. Qualitative studies comprised a smaller segment of the evidence included in this review, with in-depth interviews the most common method used. Seven rigorous reviews of literature in this field were included as evidence in this review.

Figure 4 presents the evidence in this review according to the regional focus of the study. The country focus of the studies is shown for Sub-Saharan Africa (SSA) and South Asia (SA), the two regions where the largest number of studies were located.[8] While the studies are fairly evenly distributed across SSA, SA is dominated by research focused on India.

Figure 4: The geographical focus of the literature by region (n = 170)[9]

- 11% | East Asia and Pacific
- 1% | Europe and Central Asia
- 1% | Latin America and Carribean
- 9% | Middle East and North Africa
- 6% | Multi-LLMIC regions
- 24% | South Asia
- 48% | Sub-Saharan Africa

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7. Regression analysis, correlation or PCA. See Appendix 3.
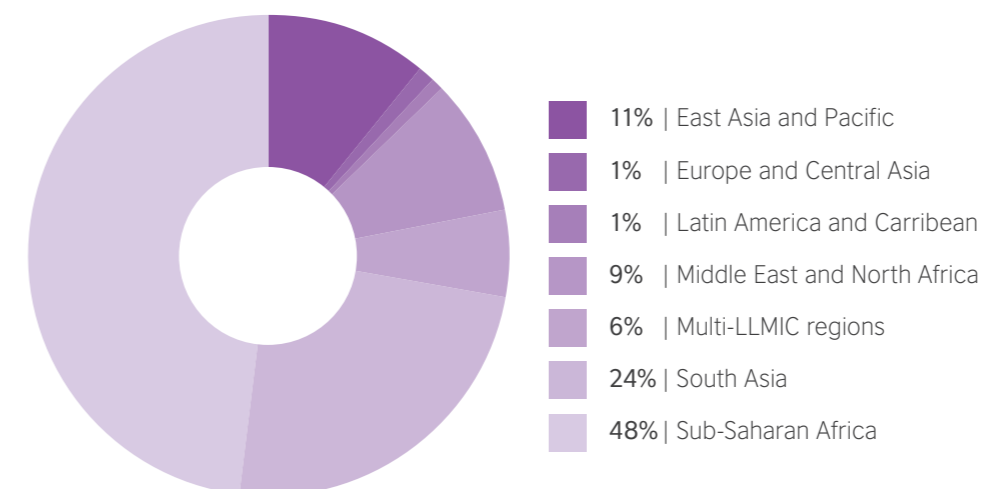
8. The country and regional focus of each study is captured in Appendix 1.
9. It is important to note, as discussed in Chapter 3, the strong influence of language on this distribution.

Table 3: The geographical focus of the literature from Sub-Saharan Africa by country

Country	Studies
More than one SSA country	29
Nigeria	10
Kenya	7
Ghana	5
Uganda	5
Ethiopia	4
Rwanda	4
Cameroon	3
Malawi	2
Senegal	2
Angola	1
Democratic Republic of the Congo	1
The Gambia	1
Lesotho	1
Liberia	1
Madagascar	1
Mozambique	1
Sudan	1
Sierra Leone	1
Tanzania	1
Zambia	1
Total	**82**

Table 4: The geographical focus of the literature from South Asia by country

Country	Studies
India	21
Pakistan	9
Bangladesh	7
Nepal	2
Afghanistan	1
More than one SA country	1
Total	**41**

Table 5: Conceptual focus of the literature according to first and second development outcome(s)

Development outcome	Total no. of studies	1st DO (no. of studies)	2nd DO (no. of studies)
Graduate skill and knowledge	35	25	10
Enhanced professional knowledge, understanding and skill among all workers	26	8	18
Economic growth	73	64	9
Poverty reduction and development of sustainable livelihoods	18	9	9
Equitable relationships	36	26	10
New knowledge that contributes to technological and social innovation	18	11	7
Strengthened and transformed institutions	19	4	15
Strengthened basic education provision	16	15	1
Strong and engaged civil society	9	8	1
Totals	**251 (n > 170)**	**170**	**80 (n > 170)***

* Not all studies had a second development outcome

Figure 5: Conceptual focus of the literature by development outcome (n > 170)

- 29% | Economic growth
- 11% | Enhanced professional knowledge, understanding and skill among all workers
- 14% | Equitable relationships
- 14% | Graduate skill and knowledge
- 7% | New knowledge that contributes to chnological and social innovation
- 7% | Poverty reduction and development of sustainable livelihoods
- 6% | Strengthened basic education provision
- 8% | Strengthened and transformed institutions
- 4% | Strong and engaged civil society

Table 3 shows that, although the largest number of country studies focus on Nigeria, the largest category of studies focus on more than one country across SSA and the literature included in this review is sparse on many countries in Africa. It can be seen that a sizeable proportion of the studies from SSA included in the review are from lower-middle-income countries in the region (Nigeria, Kenya and Ghana).

Table 4 shows that half of the studies of South Asia included in this review are on India, while the literature on Afghanistan and Nepal is sparse. In this region the majority of the studies are on three lower-middle-income countries in the region (India, Pakistan and Bangladesh).

Figure 5 shows the conceptual focuses of the studies according to the coding for one or more development outcomes. Table 5 shows this conceptual distribution when the studies were coded according to their first and second development outcome(s) (see Chapter 3). Table 6 presents the primary conceptual focus of the studies (first development outcome) by region. The conceptual picture of the studies is dominated by the relationship between TE and economic growth. Table 6 shows that this trend tends to remain intact across

each of the regions, especially within SSA and East Asia. Thus, although the initial scan of the literature had suggested economic growth as an important theme in the literature (see Figure 3), the other 'non-economic' outcomes had been more prominent. When the stricter evidence criteria were applied, studies that deal with the relationship of TE with economic growth were in the majority across most of the regions, except where there were very few studies included in the review. However, studies addressing 'graduate skill and knowledge' and 'equitable relationships' still feature fairly prominently.
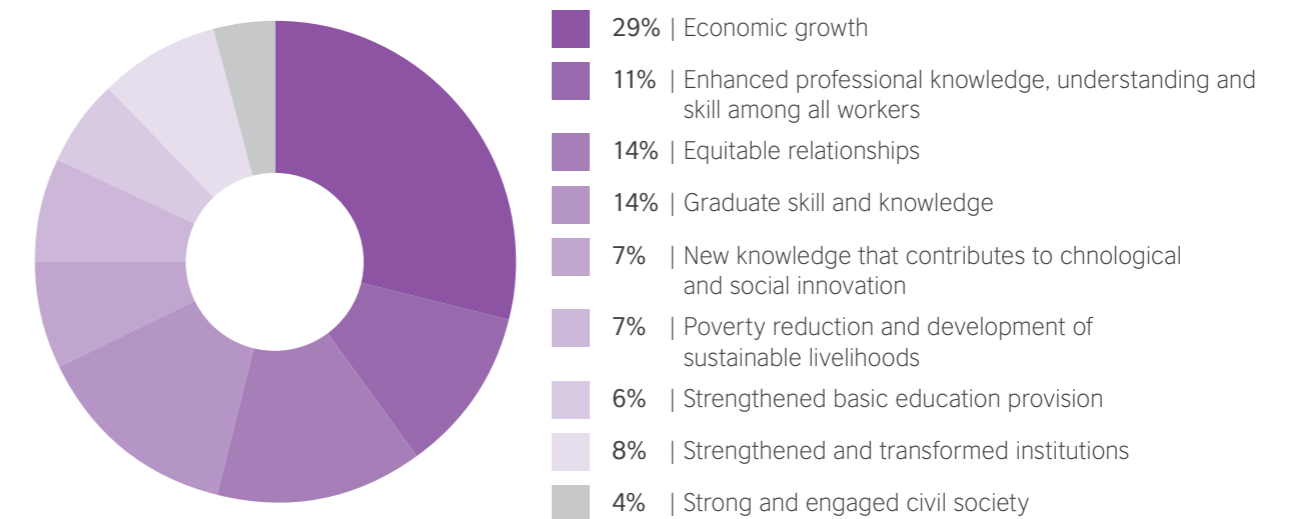
Table 6: Primary conceptual focus of the studies (first development outcome) by region

Development outcome	Sub-Saharan Africa	South Asia	East Asia and Pacific	Latin America and Caribbean	Middle East and North Africa	Europe and Central Asia	Multi-LLMIC regions
Graduate skill and knowledge	12	5	4	0	3	1	0
Enhanced professional knowledge and skill among all workers	5	1	1	0	0	0	1
Economic growth	27	19	3	1	8	1	5
Poverty reduction and development of sustainable livelihoods	4	3	2	0	0	0	0
Equitable relationships	13	8	1	1	1	0	2
New knowledge that contributes to technological and social innovation	7	2	1	0	1	0	0
Strengthened and transformed institutions	2	1	0	0	0	0	1
Strengthened basic education provision	8	2	4	0	1	0	0
Strong and engaged civil society	4	0	2	0	1	0	1

Table 7: The core functions of TE through which its role in development is enabled (first development outcome) (n > 170)**

Core functions of TE	No. of studies
Teaching and learning	145
Research	14
Innovation	23
Engagement	40
Not clear	4

** The evidence pointed at times to the involvement of more than one core function of TE.

When the evidence included in the review was mapped according to the core function(s) of TE (teaching and learning, research, innovation, and engagement) through which the pathway to change took place, the teaching and learning function dominated, a finding similar to that of Oketch et al. (2014). However, the second largest category of studies in the review by core function related to the engagement function of TE. The analysis presented in Chapter 5 suggests that this function of TE plays an important role in TE's contribution to the 'non-economic' development outcomes such as 'strengthened civil society' and 'strengthened and transformed institutions'. Table 7 shows the distribution of the studies according to the core-function(s) of TE. The limited number of studies on the research function of TE is a matter of note.

Table 8: The nature of change between TE and the first development outcome (n = 170)

Development outcome	Positive	Misaligned	Both or mixed	Total (1st DO)
Graduate skill and knowledge	3	11	11	25
Enhanced professional knowledge and skill among all workers	4	1	3	8
Economic growth	31	13	20	64
Poverty reduction and development of sustainable livelihoods	5	1	3	9
Equitable relationships	5	7	14	26
New knowledge that contributes to technological and social innovation	1	4	6	11
Strengthened and transformed institutions	2	1	1	4
Strengthened basic education provision	4	7	4	15
Strong and engaged civil society	5	0	3	8
Totals	60	45	65	170

Table 9: Modality of the change process between TE and the first development outcome (n = 170) [10]

Development outcome	Linear	Complex
Graduate skill and knowledge	11	14
Enhanced professional knowledge and skill among all workers	2	6
Economic growth	41	23
Poverty reduction and development of sustainable livelihoods	4	5
Equitable and sustainable relationships	7	19
New knowledge that contributes to technological and social innovation	4	7
Strengthened and transformed institutions	1	3
Strengthened basic education provision	2	13
Strong and engaged civil society	0	8
Totals	72	98

Table 8 analyses the literature in the review classified in terms of the first development outcome and the direction of the pathway to change between TE and the development outcome, showing whether this was coded by the researchers as positive, misaligned or having features of both. It can be seen that the majority of studies of economic growth, poverty reduction, the enhancement of professional knowledge and skill, and a strengthened and engaged civil society viewed the pathway to change as positive. However, for the other development outcomes the majority of studies suggest pathways to change that are misaligned or a mixture of positive and misaligned. We discuss this further in Chapter 5.

Table 9 shows the modality of the change process documented in the studies reviewed and whether this is presented as a linear or complex process of change. It can be seen that the majority of studies of economic growth present a linear pathway. For all the other development outcomes it is more common to see complex pathways of change. The important trends that are evident in each of the pathways are discussed in more depth in Chapter 5.

10. Studies were coded as marking a linear change process when assertions were made about one facet of TE directly affecting a development outcome, such as enrolment in TE correlating with growth in GDP. Studies were coded as documenting a complex change process when the interactions of a large range of actors or relationships were analysed or the pathways to change were documented as multifaceted.

5. Synthesis of the research evidence

Drawing on a matrix developed from the conceptual framework that was used to synthesise and analyse the evidence (see Appendix 3), this chapter discusses the main findings of the review. The discussion is organised around the role of TE in each of the nine development outcomes, with the emphasis on the findings from those studies where the development outcome under discussion was coded as their first development outcome. This synthesis shows, as already noted, that there are a number of ways in which the development outcomes overlap.

5.1 The creation of graduate skill and knowledge

Main finding: Many studies in this review highlight a 'mismatch' or misalignment between the skills and knowledge of graduates and the needs of the labour markets in LLMICs. Although the nature and scope of this 'mismatch' may differ slightly across countries and regions, attention is often drawn to the curriculum within TE institutions and the extent to which it is not adequately providing graduates with the skills and knowledge that are needed for their country's development.

Overall 35 studies were coded as providing evidence of TE's role in the creation of graduate skill and knowledge. Twenty-five were primarily or exclusively focused on TE's role in contributing to this development outcome (coded as first development outcome). Ten studies were coded as showing some evidence of TE's role

in the creation of graduate skill and knowledge, but here the evidence was weaker or regarded as secondary to another, more important development outcome (coded as second DO). The discussion that follows mainly considers the 25 studies where graduate skill and knowledge was the primary or only outcome (first DO).

All of the 25 studies dealt with core function of teaching and learning and thus the skills and knowledge graduates acquire through what they are taught and their learning experiences in TE. Only one study in Tunisia presented evidence of the engagement role of TE in the development of graduate skill and knowledge. Here students were directly involved in various engagement activities with external role players, such as employers, as part of the learning activities within an initiative towards the development of entrepreneurial skills (Premand, Brodman, Almeida, Grun & Barouni, 2012).

In half of these 25 studies evidence was collected through quantitative methods (12 studies – ten survey reports and two involving the application of statistical methods). Others used qualitative methods (six studies) and seven involved mixed methods. Twelve studies in this group researched the issues in Sub-Saharan Africa across nine different countries, and five involved research across the South Asia region (India, Bangladesh and Pakistan). Other studies were distributed as follows: East Asia and the Pacific (four studies), Middle East and North Africa (three studies), and Europe and Central Asia (one study).

A central theme across most of the 25 studies of this development outcome is a 'mismatch' or

misalignment between the skills and knowledge graduates leave TE institutions with and the needs of the labour markets in different countries. Eleven of the studies provide evidence of a misaligned pathway to change, generally dealing with graduates' knowledge and skills and the needs of the labour market or the perceptions of employers. Eleven studies suggest the pathway to change shows positive and misaligned outcomes. Where outcomes are misaligned, they are related to this 'mismatch' between TE and the labour market (Agabi et al., 2012; Amadi & Ememe, 2013; Ayoubi, Alzarif & Khalifa, 2017; Jonbekova, 2015; Alagumalai, Kadambi & Appaji, 2019; Moono & Rankin, 2013; Uzair-ul-Hassan & Zahida, 2013). These studies suggest that this mismatch is about the quality of the provision offered through TE (Agabi et al., 2012) and the appropriateness or relevance of the knowledge and skills that are being acquired (Ayoubi et al., 2017; Alagumalai et al., 2019). A number of studies suggest the problem lies with both these concerns (Amadi & Ememe, 2013; Jonbekova, 2015; Moono & Rankin, 2013; Uzair-ul-Hassan & Noreen, 2013; Sam, 2018).

A number of studies, sometimes drawing from the perspectives of employers themselves (Agabi et al., 2012; Etshim, 2017; Alagumalai et al., 2019; Kintu, Kitainge & Ferej, 2019), point to curriculum weaknesses in a number of TE programmes. These weaknesses include the concern that graduates' knowledge is too theoretical or not practical enough (Ayoubi, Alzarif & Khalifa (2017) and out of date (Amadi & Ememe, 2013; Moono & Rankin, 2013), and, similarly, that TE programmes, while sometimes providing graduates with the 'basic skills', fail to sufficiently equip them with

'non-technical' or 'soft skills' (Etshim, 2017; Gokuladas, 2010), which Gokuladas's (2010) study demonstrates are a greater predictor of employability. Exacerbating or contributing to these weaknesses is evidence suggesting that teaching staff are not sufficiently knowledgeable about the labour market (Nomura, Rahman, Goyal, Nakata & Al-Zayed, 2015) and that existing assessment practices may fail to give focus to the kind of 'transformative socio-economic knowledge' required by many LLMICs (Niyibizi, Sibomana, Niyomugabo, Yanzigiye, Ngabonziza, Jean de Dieu & Perumal, 2018). A number of studies conclude that central to these curriculum weaknesses is insufficient collaboration between TE institutions and employers around the design and development of courses (Agabi et al., 2012; Amadi & Ememe, 2013; Etshim, 2017; Kintu et al., 2019; Moono & Rankin, 2013) and a range of other systemic problems that impact on exacerbating the mismatch (Amadi & Ememe, 2013; Jonbekova, 2015). These trends are evidence across the literature focused on countries across Africa, South Asia, East Asia and the Pacific, Central Europe, and the Middle East and North Africa, suggesting that this challenge is one facing LLMICs across the world.

Some of the studies that grapple with this 'mismatch' suggest that it impacts negatively on the employment prospects of graduates (Gokuladas, 2010; Sam, 2018). However, it is also suggested that where graduates are not finding or retaining jobs, this cannot only be attributed to the quality of their knowledge and skills. Graduate employment is also strongly affected by the job market itself, which may in

effect be failing to provide graduates with decent job opportunities (Jonbekova, 2015).

Against these views of mismatch, there are some studies that point to overall positive outcomes around graduates' skills and knowledge and the labour market (Buenviaje, del Mundo, Añonuevo & Martinez, 2015), and others that show a more varied picture, with some alignment and some mismatch. For example, Kintu et al.'s (2019) study of the employability of TVET graduates in Uganda reports that employers surveyed found the graduates to have the 'basic skills' needed, but other skills and knowledge they regarded as important were not there. Premand et al.'s (2012, 2016) research on entrepreneurship education in Tunisia also showed varying results.

Five studies move beyond the link between graduate skill and the labour market and look at a broader range of graduate attributes acquired (or not) through TE, regarded as important to development, particularly within LLMICs. These studies show some evidence of the positive role of TE in the acquisition of graduate attributes that go beyond the economic dimensions of development. Important here are the positive benefits that TE is argued to provide among refugee communities, especially in relation to the levels of skill and kinds of knowledge that are important for building post-conflict societies (Wright & Plasterer, 2010; Coffie, 2014). However, some studies also point to a mismatch in this area. For example, Malik, Khan, Chofreh, Goni, Klemeš & Alotaibi (2019) point to students' poor awareness of sustainability issues within

TE programmes in Pakistan where such knowledge is regarded as important, and Schendel's (2015) findings show weak critical thinking skills among university students in Rwanda, attributes regarded as important to the country's development. Wamala et al.'s (2012) study of students' awareness and understanding of the Millennium Development Goals (MDGs) in Kenya and Uganda suggests that good levels of awareness about the MDGs were not supported by deeper knowledge about the goals and their importance.

5.2 Contributing to economic growth

Main finding: The largest body of evidence in the study deals with this development outcome and shows that economic growth and enhanced earnings for graduates are crucial development outcomes associated with TE. Although some of the evidence highlights that aggregate economic growth is not well distributed and that the income benefits of participating in TE tend to go to groups that are already established in dominant political and economic positions, the evidence as a whole points in a positive direction, associated with national economic growth, regional development initiatives, increased labour market opportunities and earnings for graduates, and skill enhancement that contributes to productivity.

Seventy-three studies were coded with economic growth as a development outcome – 64 where this was noted as the primary development outcome, and nine where this was noted as a secondary development outcome. Twenty-seven studies were based on countries in Sub-Saharan Africa, the majority in West Africa, with two on Cameroon, two on Senegal, four on Ghana and five on Nigeria. Seven of these studies researched more than one African country. Nineteen studies were based on South Asia, the majority looking at India. Eight studies looked at countries in the Middle East and North Africa. Three dealt with countries in East Asia and the Pacific (Indonesia and the Philippines), with only one having a focus on Europe (Ukraine) and one on Latin America and the Caribbean (Honduras). Multi-region studies comprised an important sub-set of this group of work (five studies). The vast majority of the studies coded as having economic growth as their first development outcome were concerned with the teaching and learning function of TE (59 studies). Only five dealt with the research function of TE, seven with innovation, and nine with the engagement function. It can be seen that studies of the relationship associated with the innovation and engagement functions of TE are more numerous than those that deal with research. This suggests either that the relationship of the research function of TE and economic growth is under investigated, or that because the research sector is small in LLMICs, it is not much noted in the scholarship.

The vast majority of studies of this development outcome used quantitative methods (48 out of the 64 studies that were coded for economic growth as

the first development outcome). The availability of a standard established methodology, such as Mincerian equations, linked with rate of return analyses, or other well-established methods of documenting relationships with economic growth drawing on credible datasets, may partly account for the larger number of studies in this area compared to the other development outcomes.

A majority of the 64 studies where economic growth was seen as the first development outcome showed a positive change pathway between TE and the development outcome (31 studies). Twenty of these studies noted the direction of change as both positive and misaligned. This indicates that, with regard to economic growth, the overall direction of change in the evidence is seen as positive to some degree (51 of the 64 studies). However, 13 of the studies pointed to a misaligned relationship between TE and the development outcome. In 41 of the studies the change process was suggested as linear, whereas in 23 the process was complex.

Of the 64 studies coded as dealing with economic growth as the main development outcome, the vast majority dealt with the ways in which TE enhanced the job opportunities and increased the earning of graduates, although some outlined how this was differentiated between groups of graduates. For example, lower earnings were noted for women graduates in Kenya (Agesa et al., 2013) and Egypt (Barsoum & Rashad, 2018) and, in India, for graduates from Scheduled Caste (SC) and Scheduled Tribe (ST) backgrounds (Frisancho & Krishna, 2012; Mitra, 2015). Some studies linked

increased earnings for some graduates to specific curriculum innovations in TE responding to industry-specific needs, with one study of a university in Bangladesh (Dutta & Islam, 2017) and one of selected TVET courses in India (Agrawal, 2012). One study in Senegal looked at generational differences in earning levels associated with an older generation having more secure employment in the public sector (Boccanfuso, Larouche & Trandafir, 2015).

Ten studies looked at GDP growth associated with numbers participating in TE. All established a positive relationship at aggregate country level. A number observed this trend over long periods for high-, middle- and low-income countries (Hailemariam, 2018) and for Africa (Gyimah-Brempong, 2011; Kimenyi, 2011). These studies were generally based on a standard method drawing on Mincerian equations. Some investigated causal links, and a study in Pakistan (Afzal et al., 2011) looked at two-way causality. One study in Morocco, Tunisia and Egypt (El Alaoui, 2015) looked at the enrolment of women in TE as a central factor linked with GDP growth.

While studies associating TE with increases in earnings and growth in GDP generally noted a positive direction of change, a small group of studies, generally drawing on survey research or qualitative interviews, noted that the skills of graduates were not appropriate to their employment. This finding accords with the evidence already discussed in Section 5.1 on studies focused directly on graduate skill and knowledge. Kirby, El Hadidi and Hala (2019) showed this in Egypt, drawing on the views of managers

who saw graduate skills as misaligned with their needs. In the Philippines, Kleibert (2015) reported how large foreign investors employed university graduates in low-skill work. Islam, Jantan, Hunt, Rahman and Abdullah (2019) reported in Bangladesh how gender relationships made it difficult for female graduate entrepreneurs to put their skills into action. Evidence emerging from these studies suggests that the mismatch between graduates and employment and productivity demands are not just about what is or is not learned. Rather it is a complex relationship associated with the strategies of the firm and existing social relationships, of gender or ethnicity, which come to be reproduced in a negative or misaligned direction of change between TE, economic growth and equity. A number of studies drew out mixed results around these issues. Banerjee (2016) drew out how the earnings gained from participation in TVET in India depended on the industry, while Fasih, Kingdon, Patrinos, Sakellariou & Soderbom (2012) – also reviewing labour market returns in India – highlighted the significance of regional location. Jacob (2018) noted differences in earnings across disciplines studied. In Ukraine, Gebel and Baranowska-Rataj (2012) noted how rate of return on participation in TE was associated with the kind of institution attended. Different kinds of inequalities are thus entailed in some of the mixed outcomes associated with increased earnings.

A cluster of studies identified TE, particularly regional hubs away from the capital, as significant for regional economic development associated with infrastructure, local employment beyond the TE institution, and agricultural development. These

studies in Cameroon (Fongwa & Wangenge-Ouma, 2015) and Morocco (Driouchi & Zouag, 2011) highlight a network of economic relationships associated with the establishment of TE in a region, not just a single pathway through employment. This seems an important area for further research.

One mixed-methods study looked at consumption patterns (Kirui, 2018) in Malawi, Ethiopia and Tanzania, drawing out increased consumption of goods and services associated with graduates. The lack of studies which focus on consumption, and what Fine, Bayliss and Robertson (2016) highlight as the systems of provision associated with these relationships, indicates that research on the economic outcomes of TE has many branches of investigation still to follow.

Where studies identified a misaligned development outcome, this was linked with either inequalities in earnings for some groups, such as women or scheduled castes, as noted above, the brain drain from Africa (Capuano & Marfouk, 2013) or the failures of specific forms of TE to meet requirements for appropriate innovation or training. Thus a study of TVET in India (Ahmed & Chattopadhyay, 2018), which compared different kinds of TVET, particularly that provided by institutions, and on the job training, found that there was a gap between the kinds of training provided by institutions and what was needed by employers to make profits. A randomised control trial of entrepreneurship education in Tunisia and the ways in which this was linked to economic development, concluded that graduates were not able to apply their skills four years after their studies were completed (Alaref, Brodmann &

Premand, 2019). The uneven experiences with innovation were noted in a number of studies. The difficulties of building appropriate skills for growth in the ICT sector were particularly noted for Africa (Evoh, Mugimu & Chavula, 2014), of linking research with the needs of the knowledge economy highlighted for South East Asia (di Gropello, Tandon & Yusuf, 2011), and of supporting women entrepreneurs documented for Indonesia (Karina, Gunawan, Stoffers, Sunanto & Byomantara, 2017).

5.3 Poverty reduction and the development of sustainable livelihoods

Main finding: Poverty reduction does not present as a directly intended outcome of TE. However, there is some evidence to show that participating in TE may increase lifetime earnings or entrepreneurial activities of groups who were born poor. A small body of evidence shows that under certain conditions TE's capacity to provide technological or managerial support can be oriented to addressing aspects of poverty, which can have beneficial results.

Eighteen studies were coded as providing evidence of a contribution to poverty reduction (nine with this as the primary development outcome, and nine with this as a secondary development outcome). A very limited range of countries were studied, with studies of three countries in Africa (Nigeria, Cameroon and Rwanda), one of India, two of Pakistan, one in the Philippines and one in Timor-Leste.

There was one overview study of Africa (Majgaard & Mingat, 2010) which stressed the importance of government choices to link work on TE to poverty reduction.

The majority of studies looking at this relationship used quantitative methods, and, of these, the general view was that TE was associated with positive effects. These included poverty reduction increasing earnings for poor youth in Nigeria (Ukueze, 2014), protecting against food insecurity in Timor-Leste (Jha & Dang, 2012), developing opportunities for non-farm employment in rural areas in the Philippines (Ramos, Estudillo, Sawada & Otsuka, 2012), and reducing income inequality in Pakistan (Qazi, Raza, Jawaid & Karim, 2018). A small group of qualitative studies looked at the poverty reduction initiatives of particular institutions in Rwanda (Collins, 2012) and in Cameroon (Mbah, 2015). One qualitative study looked at the entrepreneurial activities of TE graduates who had been born poor, and their complex relationships with the poor communities they had grown up with (Young & Kumar, 2016).

Only one quantitative study, which highlighted how government expenditure on TE in Pakistan was not pro-poor, showed evidence of a clearly negative outcome (Asghar & Zahra, 2012). The other studies noted mixed outcomes with regard to poverty reduction, suggesting that positive change was dependent on government policy (Majgaard & Mingat, 2010) and the kinds of relationships built with local communities (Mbah, 2015). Generally the quantitative studies established a linear relationship of positive or misaligned change, while more complex relationships were associated with the qualitative studies. Virtually all the studies dealt with the teaching and learning function of TE, although two

looking at community partnerships (Mbah, 2015 and Collins, 2012) dealt with the engagement function.

5.4 Creating equitable relationships

> **Main finding:** The evidence that provides insight into the role of TE in the creation of equitable relationships suggests that TE contributes positively in a number of different ways to enhancing quality of life, both for those who participate in it and through the influence of its graduates. However, the evidence also suggests that there are a number of ways in which TE may maintain hierarchies and exclusions, and may be complicit in relations of violence, thus reinforcing or deepening existing inequalities.

Thirty-six studies were coded as showing evidence of TE's role in equitable relationships. Of these 26 were coded as showing evidence of this as the primary development outcome (first development outcome) and ten with this outcome as secondary to other development outcomes (second development outcome). Considering the cohort of 26 first development outcome studies, in particular, the majority investigated the core function of teaching and learning in TE as central to this relationship (25 studies) and a small number with the engagement function (ten studies). Only two of these studies dealt with the research function and only three with the innovation function. The majority of these studies used qualitative methods (15 studies). Two were mixed-method studies and nine quantitative. Of these six involved using statistical methods, including correlations of public

spending on higher education and the socio-economic groups that benefit directly from it (Ilie & Rose, 2018), and higher education, household assets and declines in fertility (Sid, 2010). Thirteen studies dealt with countries in Africa and eight with countries in South Asia. There was one study based in East Asia and the Pacific (Papua New Guinea), one study in Latin America and the Caribbean (Honduras and Nicaragua), and one in the Middle East (Occupied Palestinian Territories). Two studies involved more than one region.

Of the 26 first development outcome coded studies, four showed a strongly positive pathway to change between TE and equitable relationships, with 14 showing the direction of change as mixed. Eight studies showed evidence of a negative change process between TE and this development outcome. Of these latter eight, four deal with the entrenchment of power and privilege associated with participants in TE, as students (Ilie & Rose, 2018; Baily, 2015; Thomas, 2019) and as teachers and managers (Morley, 2011, 2012). Others deal with the silencing and exclusions associated with the experience of women students from working class backgrounds in Pakistan (Tayyaba, 2013) and students from indigenous backgrounds in Bangladesh (Gerharz, 2016). These studies therefore point to the ways in which TE may maintain hierarchies and exclusions, and be complicit in relations of violence.

Seven studies suggested that the process of change is linear and this research was generally associated with the use of quantitative methods, including surveys. However, the majority of studies (19) suggested that the process of change is complex, with multiple pathways, not all of them always going in a positive direction. In these cases the research often suggests that the understanding,

networks or confidence TE confers is intermixed with difficulties from the contexts in the countries studied, where existing power relationships frustrate or undermine the equitable relationships TE aimed to inculcate.

An important theme that emerged was from a large group of studies that looked at the ways in which TE enhances aspects of quality of life by:

- expanding opportunities for better relationships, including those that may reduce intimate partner violence
- facilitating upward social mobility
- expanding social networks
- contributing to peace-building equity, open societies and democratic states (Truex, 2011; Milton & Barakat, 2016; Agbor, 2015)
- supporting the SDGs
- engaging with equity.

The majority of these studies drew out how experiences with TE had both positive and negative outcomes with regard to equitable relationships. Thus, for example, while TE was generally protective for women against intimate partner violence in Uganda, in some regions this was not the case (Amegbhor, 2019). Similarly, in India engineering education was associated with upward social mobility, but not for some marginalised groups (Upadya, 2019). A number of studies also show how women graduates experience some aspects of empowerment or enhanced agency, but how this is crosscut by entrenched sexism in society (Skjortnes & Zachariassen, 2010; Vail, 2015).

A smaller number of studies identify a single facet of the equitable relationships that participating in TE supports. For example, less tolerance of corruption in Nepal among graduates (Truex, 2011); an enhanced sense of empowerment among women

graduates in Pakistan (Malik & Courtney, 2011); or graduates from poor rural backgrounds being able to take on leadership roles supporting local rural development (Rodríguez-Solera & Silva-Laya, 2017) in Honduras and Nicaragua. But, this small body of work affirming unambiguous positive relationships is not corroborated by other studies in a particular region or across the majority of the literature in the review.

A number of studies look at the way specific programmes of TE contribute to building equitable relationships in local communities, with a focus on agricultural development in Honduras (Rodríguez-Solera & Silva-Laya, 2017) and knowledge of risks associated with HIV in Uganda (Amutuhaire, 2013). One study across Africa looks at the development of knowledge on political stability and non-violence (Asongu & Nwachukwu, 2016). The focus on specific programmes in this group of studies, and short- or medium-term outcomes, means that the 'long run' direction of change cannot yet be seen.

5.5 Generating new knowledge that contributes to technological and social innovation

> **Main finding:** Technological and social innovation do not currently happen at optimum in LLMICs, because there is poor connectivity between TE and the knowledge needs of a country, community or society, be that in relation to health, environmental problems, industrial development or enhancement of ICT. The evidence considered in this review shows mixed outcomes, with many missed opportunities to connect well, and align inputs, outputs and processes.

Eighteen references were coded as dealing with this theme (11 were coded with this as the primary development outcome and seven were coded with this for the secondary development outcome). The majority of studies showing this relationship included in this review have involved research focusing on Africa, with one on India, one on Pakistan, and one on Cambodia. Very few of these studies use quantitative methods, relying on case studies, interviews, historical policy analysis and literature reviews. These three reviews consider whether published research literature from universities in Cambodia responds to the public health needs for forms of social innovation (Goyet, Touch, Ir, SamAn, Fassier, Frutos, Tarantola & Barennes, 2015), whether published research from universities in Sindh province in Pakistan respond to environmental needs for innovation (Lashari, Bhutto, Rashdi & Qureshi, 2015), and how agricultural systems research can be used in Africa (Posthumus, Martin & Chancellor, 2013).

Some studies mapped a linear relationship between TE and some innovations, but the majority highlighted how this was a complex multifaceted engagement with many networks and processes in play. While two studies deal with teaching and learning in TE and their connection with innovation (Cloete, Bailey & Pillay, 2011; Cloete, Maassen & Bailey, 2015), the majority of studies in this group point to the innovation function of TE in these relationships, sometimes linking innovation and research (Cloete et al., 2011, 2015; Lashari et al., 2015; Gayet et al., 2015). One study of ICT and partnerships around innovations with local communities in Namibia and Zimbabwe linked innovation and engagement at community level (Luckson, Mtetwa, 2014), one at the

level of strengthening systems for agricultural production (Posthumus et al., 2013), and one linked innovation and engagement with governments delivering on the MDGs (Obamba, Kimbwarata & Riechi, 2013).

Only one study (Obamba et al., 2013) reported on an unequivocally positive relationship of social innovation by universities in Africa to achieve the MDGs, but the discussion here was at quite a general level of policy statements. Closer investigations of the kinds of partnerships between universities and governments to effect these outcomes investigated for 'flagship' universities in Kenya, Uganda, Tanzania and Mozambique (together with other middle-income countries in Africa) showed limited institutional architecture and few experiences of direct collaboration linked to delivery (Cloete et al., 2011, 2015). Studies of university–industry connections on innovation also showed very uneven kinds of collaboration in Nigeria and Uganda (Kruss, Adeoti & Nabudere, 2012), and Mozambique (Zavale & Macamo, 2016). A study in Egypt found there was minimal communication between universities and firms with regard to innovation (El Hadidi & Kirby, 2017). Similarly, the potential for collaboration around innovation in India was found to be under-utilised (Datta & Saad, 2011). Thus the majority of studies of social and technological innovation suggest the relationship is mixed or misaligned. While this may be read as a finding about the failures of TE in LLMICs to deliver on their potential for innovation, the studies conducted do point to the areas that need strengthening with the potential for future research collaborations between TE and relevant partners in

government, industry, agriculture and community development.

5.6 Strengthening basic education provision

Main finding: The evidence shows that TE's role in the strengthening of basic education is primarily enacted through the provision of teacher education programmes and thus through its teaching and learning function. The evidence shows, however, that misalignment often exists between these programmes and teachers' practices in the classroom. This 'mismatch' is shaped by both curriculum weaknesses and complex contextual factors that hinder the translation of what is learnt into meaningful practice.

In total 16 studies were identified as providing evidence of the role of TE in strengthening basic education. Fifteen of these were coded as having this outcome as the primary concern of the evidence (coded as first development outcome). Of these 15 studies all deal with the teaching and learning function in TE and its role in the preparation and ongoing training of teachers for national education systems. It is important to note here that while there are many studies that focus on issues of teacher training, especially within LLMICs, we only included studies that explored TE's role in teacher training, either through the provision of pre-service teacher education or through programmes offered at the postgraduate level for the ongoing professional development of practicing teachers.[11] The 15 studies all provide

evidence of research carried out in a particular country, with eight from Sub-Saharan Africa, two from South Asia, four from East Africa and the Pacific, and one from the Middle East and North Africa. All 15 studies were undertaken in low-income countries. There was a stronger orientation to qualitative research designs in the studies, with four using only qualitative methods and nine involving some form of qualitative research as part of a mixed-method study. Only two studies used only quantitative methods and involved survey reports.

All 15 studies grapple in some way with the issue of teaching practice and TE's role in the development of teachers' knowledge and skill to inform their practice in the classroom. However, while this is the overarching focus, only four studies provided evidence of unambiguously positive pathways to change between TE and teachers or teacher educators' learning and practice (Murphy & Wolfenden, 2013; Situmorang, Gultom, Hamid K, Panjaitan & Ritonga, 2018; Van, Mao & Cnudde, 2018; Lopes, Costa & Matias, 2016).

Van et al.'s (2018) study evaluated one area of impact from a three-year intervention in Cambodia with teacher educators, providing evidence that the gaps in teacher educators' knowledge which the intervention aimed to address were significantly reduced, improving their content knowledge and their teaching skills (pedagogical content knowledge). Lopes et al.'s (2016) research into the impact of two master's courses in a higher education institution in Angola demonstrates the strong impact the courses had on teachers' professional practice. They suggest that the positive evidence of change brought about by

these programmes demonstrates the value of postgraduate programmes offered to teachers by TE institutions, which 'go further' than many of the kinds of 'non-academic' training that practising teachers undertake. Murphy and Wolfenden's (2013) study on teachers' use of open educational resources as part of the TESSA programme[12] reports on ways in which teacher educators at a Kenyan university brought about changes in pedagogical practice in their institutions with their partner schools, recognising, however, that such change is dependent on a number of institutional and contextual factors. Situmorang et al. (2018) demonstrate the value of university and local government collaboration in Indonesia for improving teacher competence.

The other 11 studies all provide some evidence, albeit in different ways, of a mismatch between the curriculum or what is being taught in teacher education programmes and teachers' practice, suggesting pathways to change that are either misaligned (Hardman, Abd-Kadir & Tibuhinda, 2012; Pryor, Akyeampong, Westbrook & Lussier, 2012; Akyeampong, Lussier, Pryor & Westbrook, 2013; Al Amin & Greenwood, 2018; Alshamy, 2016; Iwakuni, 2017; Buzdar, Jalal & Mohsin, 2018) or mixed (Oluga, Kiragu, Mohamed & Walli, 2010; Otaala, Maani & Bakaira, 2013; Nguyen Thi Mai & Hall, 2017; Kusaeri & Aditomo, 2019).

What is evident from the studies which explore support to basic education as the primary development outcome is that those factors that inform and shape this mismatch are complex. They point to contextual factors such as large classes that undermine the ability of teachers to apply what they have learnt (Otaala et al., 2013; Al Amin

& Greenwood, 2018) and gaps between the attributes and skills developed through the curriculum and those required by teachers for effective practice in the classroom (Buzdar et al., 2018; Al Amin & Greenwood, 2018). What is also evident is that forms of teaching practices of the past have informed teachers' own learning experiences (Iwakuni, 2017). Cultural beliefs around authority, including in the classroom, may continue to shape what happens in this space in complex ways (Nguyen Thi Mai & Hall, 2017), even where teachers' training has been oriented towards new ways of thinking and practice.

5.7 Enhancing professional knowledge, understanding and skill among all workers

Main finding: Tertiary education's role in enhancing professional knowledge, understanding and skill happens primarily through the teaching and learning functions of higher education and TVET institutions, impacting across a range of sectors and involving a range of programmes and initiatives at different levels of post-secondary education. On the one hand, the evidence points to positive outcomes, mainly through innovative initiatives to enhance particular kinds of professional knowledge and skill, emphasising the importance of TE's role in the development of professional capabilities across LLMICs. However, it is also clear that a range of contextual factors undermine the capacity of TE systems to play this role effectively.

Twenty-six studies were coded as providing evidence of TE's role in enhancing professional knowledge, understanding and skill among all workers. However, only eight of these were coded as having this development outcome as their primary focus (first development outcome). Most of the 18 remaining studies (second development outcome) spoke to TE's role in supporting basic education through the training and development of teachers, with teachers' professional knowledge regarded as an important secondary outcome of those studies that dealt with teacher education and which are discussed in Section 5.6. This section focuses mainly on those studies that spoke to professional knowledge, skill and understanding beyond teachers (coded with professional knowledge as their first development outcome).

Of this cohort of eight studies, the evidence had mainly been gathered through the use of qualitative methods (three involved interviews and four involved quantitative surveys and interviews). One rigorous review was included in this evidence, which looked at the literature on TVET and skills training in fragile and conflict-affected countries (Pompa, 2014). Five of the studies explored countries in Sub-Saharan Africa, with only one from South Asia and two involving research across more than one region. Once again the core function featured prominently in these studies. All eight spoke to the teaching and learning function of TE in the enhancement of professional knowledge and skill, with only three of these also linking this role to the innovation and engagement functions of TE.

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11. See Chapter 4 where we discuss the research process we followed to explore this development outcome and the limitations of this in the context of the review.

12. Teacher Education in Sub-Saharan Africa Programme. See www.tessaafrica.net

Four of the studies in this cohort showed positive pathways to change. These studies all gave focus to particular initiatives that had sought in some way to enhance professional capabilities through university education or TVET. What is interesting is that this positive change took place through a range of different initiatives – each with its own modality and objectives. These included:

- a collaborative North–South–South postgraduate education partnership to enhance the specialist skills of doctors in South Asia and Africa (Amare, Lutale, Derbew, Mathai & Langeland, 2017)

- a South–South collaboration between universities in Lao PDR and South Korea aimed at upgrading the medical education capacity of faculty at the university in Lao PDR (Kim, Kim & Shin, 2019)

- a government-driven, community-based TVET initiative in Ghana (Pongo, Effah, Osei-Owusu, Obinnim & Sam, 2014)

- initiatives in a number of universities in Africa that sought to enhance technical and technological capabilities to promote employment and innovation in Africa (Mihyo, Hammond, Makhoka & Tjihenuna, 2011).

While the other studies showed some positive outcomes, they also pointed to more complex and varied processes of change where some of the outcomes were less positive (Lahire, Johanson & Wilcox, 2011; Pompa, 2014; Satendra & Craig, 2017). Once again, the influence of contextual factors or forces on TE efforts towards professional knowledge development was evident, including, for example, the paradoxes emerging from the rise of youth entrepreneurship as part of a rapidly expanding higher education system in India (Satendra & Craig, 2017), the impact of underfunding or inadequate resources on the development of TVET capacity in the Gambia (Lahire et al., 2011), and the development of graduates able to make a meaningful contribution to rural agricultural development in Sierra Leone (2015).

5.8 Strengthening and transforming institutions

> **Main finding:** The role of TE in strengthening and transforming institutions is strongly enabled through its participation within collaborative relationships and partnerships that are facilitated through its teaching and learning and engagement functions. However, a range of broader national and global inequalities affect the functioning of institutions, creating complex processes of change that need to be managed and grappled with.

Nineteen studies showed evidence of TE's role in strengthening and transforming institutions. However, only four of these were coded as showing evidence of this relationship as the primary or most important development outcome explored in the study (first development outcome). The other 15 studies were coded as showing some evidence of this relationship, but this was given less focus or was weaker than the relationship between TE and another development outcome (second development outcome). The contextual focuses of the studies showed the general trend across the evidence base, i.e. most studies (ten) were about the Sub-Saharan region, four were about two countries in South Asia (Bangladesh and India), three were conducted in the East Asia region, one was about the Middle East and North Africa, and one involved research across multiple LLMIC regions. In most studies (17), data was collected through qualitative methods or through mixed methods, with only one quantitative study and one rigorous review. These studies pointed to the teaching and learning and engagement functions of TE as equally important to its role in this development outcome.

A theme that emerges across the evidence in these 19 studies concerns the strengthening and transformation of institutions through forms of collaborative relationships within or with TE. This may involve the strengthening and transformation of TE institutions themselves through partnerships or networks with other TE institutions or research entities (Cloete et al., 2011; Allen, 2014; Johnson, Hirt & Hoba, 2011; Amare et al., 2017; McNae & Vali, 2015; Situmorang, 2018), with different levels or structures of government (Magara, Bukirwa & Kayiki, 2011; Situmorang, 2018), and with employers or industry partners (Kirby, 2019), or through international development co-operation initiatives (Nomura et al., 2015). It may also involve the strengthening of other institutions through collaboration with TE, for example through the involvement of students in internships within community structures or knowledge transfer as a practice component in their studies. Magara et al. (2011) argue that TE students played an important role in strengthening local government in Uganda through field placements in these structures. McNae and Vali (2015: p. 295) also present evidence of the value of intra-institutional networks formed by women in higher education institutions in Papua New Guinea that have been important to disrupting 'gendered leadership practices' and thus contributing to change across institutions. However, while the evidence of the value of such collaboration and partnerships is strong, there is also some evidence that points to important challenges that need to be managed as part of these collaborations, such as ensuring the contextual relevance of partnerships especially where they involve North–South collaborations (Allen, 2014). Moreover, the argument is consistently made that while such forms of collaboration are important in LLMICs, many partnerships that exist are weak or there are not enough collaborative initiatives in place to sustain the relationships (Cloete et al., 2011; Kirby & El Hadidi, 2019). These weaknesses have important consequences for the institutions and the broader society.

While the studies discussed above largely point to positive processes of change, a number of studies in this cohort also provide evidence that points to a negative impact on the development of 'dysfunctional' institutions – what Husain and Osswald (2016) call 'Zombie' institutions in the context of Bangladesh. Morley (2011) looks at institutions through a lens of sexual harassment and gendered power relations within universities, suggesting that what happens within the university negatively affects both women's participation in TE education and general levels of violence against women. Similarly, Thomas (2019) draws attention in the Indian context to the impact of neo-liberalism on institutional culture and how these 'cultivate the terrain for moments of race and caste violence'.

Among these studies, 18 out of the 19 demonstrated complex processes of change between TE and the strengthening and transformation of institutions. A number of these studies point to broader national and global inequalities that impact on the functioning of institutions with consequences for their transformative potential (Osswald, 2016; Thomas, 2019).

5.9 Contributing to a strong and engaged civil society

> **Main finding:** Although drawing from a small body of literature, the evidence in this review shows that TE plays (or has the potential to play) a very important role in strengthening and building the capacity of a vibrant and engaged civil society. Change is enabled by the kinds of knowledge and skills that graduates acquire and through the 'space' that institutions provide for forms of engagement and relationship building, especially in the context of strengthening and building democracy. However, the evidence also shows that tertiary education's relationship with civil society often involves managing complex processes and conflicting influences, all of which institutions and systems are required to manage.

Nine studies showed evidence of TE's role in the development of strong and engaged civil societies. In eight these concerns were central to the research (coded as first development outcome) and in one the research shows evidence of this role as part of a range of important development outcomes (Cloete et al., 2011). Although these eight studies constitute a small body of evidence, the research reported on in these studies generally shows strongly positive pathways to change (five studies), suggesting that TE plays (or has the potential to play) a very important role in strengthening and building the capacity of a vibrant and engaged civil society. Where the studies showed evidence of a more mixed pathway (three studies), the researchers draw attention to important contextual factors as crucial here, suggesting that they tend to undermine the valuable ways that TE is or could be contributing to the development of civil societies in LLMICs. No studies showed a negative relationship between TE and the development of civil society.

The studies used a range of methods, with two using quantitative statistical manipulation, four a range of qualitative methods, and two mixed methods (quantitative surveys and interviews). Once again, the contextual focus of the studies is dominated by Sub-Saharan Africa (four studies). However, no studies spoke to the South Asian region, but there were two studies from East Asia and the Pacific (Myanmar and the Philippines), one study addressing the Tunisian context (Middle East and North Africa), and one study considering the issues across a number of regions. While three studies suggested that TE's role in strengthening civil society is enabled by its teaching and learning function, the core function that dominated across the studies was engagement, emphasising its importance to how this role of TE may be enabled.

Of the studies that showed a strongly positive change pathway, all draw attention to the ways in which participation in TE facilitates particular levels of understanding and skill that are regarded as important to stable and democratic societies (Luescher-Mamashela & Kiiru, 2011; Mattes & Luescher-Mamashela, 2012; Johnson, 2013; Pellicer, Assaad, Krafft & Salemi, 2017; Hong & Kim, 2019). While some point to the development of such understandings among a range

of role players within TE institutions (Johnson, 2013), there is a strong emphasis in this cohort of studies on the knowledge and skills acquired by students and graduates (Luescher-Mamashela & Kiiru, 2011; Mattes & Luescher-Mamashela, 2012; Pellicer et al., 2017; Hong & Kim, 2019). Central here is the evidence that points to the acquisition of skills and knowledge among students and graduates that, among other things, enables them to deal more effectively with complexity, particularly within the context of democratic societies and their institutions (Luescher-Mamashela & Kiiru, 2011; Mattes & Luescher-Mamashela, 2012; Johnson, 2013). Such understandings enable a deepened and more nuanced engagement with political problems (Pellicer et al., 2017) and allow for the development of new forms of 'consciousness' that draw from different disciplines, forms of knowledge and experiences (Johnson, 2013).

A number of the studies develop these arguments further to emphasise the extent to which these attributes are enabled by the functioning of TE institutions as particular kinds of 'spaces'. It is argued that on the one hand they provide spaces, especially for students or young people, which enable experiences of democracy (Hong & Kim, 2019) and enhance 'democratic attitudes and behaviours' (Leuscher-Mamashela & Kiiru, 2011). Such experiences, it is suggested, are strongly enabled through students' participation in leadership and governance structures in institutions and through student activism (Luescher-Mamashela & Kiiru, 2011; Mattes & Luescher-Mamashela, 2012; Hong & Kim, 2019). Participation in such a 'space' has important implications for future leadership (Schweisfurth, Davies, Symaco & Valiente, 2018) and formal political participation (Pellicer et al., 2017). Moreover, it facilitates new ways of working and engaging that are important to managing conflict and rebuilding societies in post-conflict contexts (Johnson, 2013; Pellicer et al., 2017; Hong & Kim, 2019).

While the evidence from these studies suggests a positive role for TE in the strengthening of civil society, especially within the context of democracy and emerging democracies, all of the studies suggested that effecting change through this relationship is complex. This complexity is often linked to particular contextual factors that may undermine the capacity for TE institutions to play this role, suggesting that these 'spaces' are especially vulnerable ones. Noted in the studies as especially important is the impact of broader societal corruption (Duerrenberger & Warning, 2018), the influence of party politics (Luescher-Mamashela & Mugume, 2014), and the power and influence that may come through the networks that TE may enable (Schweisfurth et al., 2018). The evidence therefore suggests that the pathways to change between TE and the development of civil society often involve managing complex processes and conflicting influences, all of which institutions and systems are required to manage.

This chapter considers some additional elements of the review that we regarded as important in understanding the role of TE in development in LLMICs and which add value to the broader concerns of the study.

6.1 Conceptualising and problematising the role of tertiary education in development

During the process of reviewing literature for inclusion in the study, we identified a number of studies that met the conceptual criteria for inclusion in the study, i.e. their primary focus was on the relationship between TE and development within one or more LLMIC. However, on closer analysis these were not included in the review, because they did not meet our evidence criteria and were therefore not coded in the same way as the evidence presented in Chapter 5. Many of these studies were theoretical and conceptual in nature, considering the relationship of TE and development in a particular country or region and grappling with a number of conceptual or theoretical issues. We discuss below some of the emerging themes, ideas and research directions from this literature that resonated with our research questions.

From this literature two themes emerged that suggest a negative relationship between TE and development, highlighting how TE is implicated in harm. First, a number of authors discuss neo-liberalism and the extent to which TE has become embedded in the deepening or widening of existing inequalities, including through the commodification of public goods (Ali, Saeed & Munir, 2018; Sarker, 2015; Kandiko Howson & Lall, 2020). Secondly, some studies deal with connections between TE and the promotion of violence and criminality within societies (Adebisi & Agagu, 2017; Aghedo, 2015). Much of the evidence discussed in Chapter 5 suggested misalignment between TE and development outcomes, but these studies suggest TE may actively contribute to the underdevelopment of societies and widen inequalities. This argument is also emphasised in some of the literature that deals with TE and the complex ways in which it may reproduce (or challenge) a colonial legacy (Agarwal, 2014; Hossain & Khan, 2015; Mansoor & Malik, 2016; Shahjahan, 2016).

While these works suggesting negative relationships give pause for thought with regard to how TE is positioned, how its governance and administration does or does not engage with local needs, and how it delivers on its core functions, other conceptual and theoretical studies highlight more positive themes. A number of studies discuss how to theorise or conceptualise the relationship of TE to economic development and the enhancement of prosperity. However, unlike the empirical studies reviewed in Chapter 5 – which, because of the precision of data, focused on economic growth and income from employment – these studies tended to be more concerned with considering this relationship in relation to wider aspects of prosperity (Kruss, McGrath & Petersen, 2016; Joshi, 2018) or human development (Boni & Walker, 2016).

A number of these studies set out relationships with the state, where TE is a crucial setting for the enactment of public policy or for forming new kinds of relationships with evolving forms of the state (Marginson, 2016; Carnoy, Loyalka, Dobryakova, Dossani, Froumin, Kuhns, Tilak & Wang, 2013; Carnoy et al., 2014).[13] Some studies identify how TE can support states in delivering the SDGs (Salmi, 2017; McCowan, 2019) and on national vision documents (Mugizi, 2018). Others deal with the issue of TE and the public good, working to map meanings for the relationship of TE and the public good (Marginson, 2016; Collins, 2013; Unterhalter et al., 2019). An orientation of TE to the development of public good professionals is discussed (Walker, McLean, Dison & Vaughan, 2010). The enactment of relationships and partnerships oriented to the public good or other kinds of positive development outcomes is also raised. These include partnerships with civil society (Khatun, 2012) and partnerships aimed at building research capacity (McGregor, 2015), supporting rural development (Malcolm, 2016), and supporting the building of South–South networks (Assié-Lumumba, 2017). Some of these studies raise questions about the relationship with the state and how ideas about public good or positive development outcomes are engaged with. Some of these issues have been investigated empirically, as discussed in Chapter 5, but what this primarily conceptual and theoretical literature highlights is some of the nuances in the relationship between TE and different forms of the state, and some of the complexities around understandings of the public good.

Some of this literature grapples with ethical ideas around the role and purpose of TE, indicating scope for more empirical work in these areas.

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13. Some of these studies do include empirical chapters but without detail on LLMICs.

A central theme concerns human development, putting the development of capabilities and a wide range of opportunities for individuals at the centre of TE policy formation – so that human flourishing is seen as an end, not a means (Boni & Walker, 2016). This work draws on a rich vocabulary of ethical concepts positioning TE as a major setting for applied ethics. The association of TE with peace building is noted (Alimba, 2013), as is its contribution to sustainability and disaster risk reduction (Maila & Seroto, 2013; Sharma, Uppal & Mahendru, 2016; Shaw & Abedin, 2015), roles also discussed in some of the studies explored in Chapter 5. Some studies also grapple with the association of TE with support for equity (Carnoy et al., 2013, 2014; Unterhalter & Carpentier, 2010) and diversity (Collins, 2013), although the difficult and contradictory conditions for realising this are noted, as is the case in many of the studies discussed in Chapter 5.

Taken together these studies have implications for the conceptual framework that underpinned this study, as they suggest a repositioning of human development, equity and sustainability as central features or pillars of the delivery of TE, not just as outcomes. They also widen the scope for investigating some of the economic outcomes of TE beyond those associated with employment. These studies also highlight that the relationship of the state to TE is not just associated with financing or governance. Rather they suggest that the state has a responsibility to position TE as a setting for the realisation of public good and to craft public policy and resources to realise this.

6.2 The value of international development co-operation in strengthening tertiary education's role in development

Oketch et al. (2014) argued that external aid had played an important role in the history and development of TE in LLMICs and drew attention to the ways that studies around these initiatives could provide useful supporting evidence to inform the central findings of their review. We were similarly concerned to consider, as we looked at the more recent literature, the role of development co-operation in strengthening tertiary education's relationship with development outcomes in LLMICs. We discuss below our broad findings on this theme. These insights draw from studies that met the evidence criteria for inclusion [14] and those that, although not meeting the evidence criteria, provided some useful insights into this relationship. We acknowledge these insights do not draw from a rigorous search and engagement with all the literature on development aid and TE in LLMICs. Our reflections here only draw from those studies that emerged through the main search process we undertook for this review and therefore are not exhaustive in what they suggest is happening regarding development aid and TE in LLMICs. Similarly, we do not draw conclusions on, or engage critically with, any of the discussion on the impact of this aid on the relationship between TE and development outcomes in LLMICS. We simply present a descriptive overview from the literature surveyed of the ways in which development co-operation is being used in efforts to strengthen TE's contribution to development.

The majority of studies showed the use of development aid to gather information and/or research insights

about TE within one or more LLMIC. These studies had been undertaken by an international development partner or involved the use of development aid funding to support the completion of a study. In some cases, these studies were undertaken by the international organisation themselves, but often they involved collaboration with local organisations, including local TE institutions or regional TE networks.

A number of these studies were strongly 'diagnostic' in nature, often involving empirical research, policy engagement, literature or evidence reviews, and conceptual thinking on the strengths and weaknesses of a TE system or an aspect of it within or across a country or region (di Gropello et al., 2011; Lahire et al., 2011; Neal, 2011; Majgaard & Mingat, 2012; Krishnan & Shaorshadze, 2013; Posthumus et al., 2013; UNESCO, 2013; Al-Zayed, Mukherjee, Nagashima, Nomura, Rahman, Rahman, & Dhar, 2014; Guerrero, 2014; Pompa, 2014; Ndaruhutse & Thompson, 2016; HEART, 2014, 2016; Eicker, Haseloff & Lennartz, 2017; Ilavarasan, Kar & Aswani, 2017; GIZ, 2018; Rahman, Nakata, Nagashima, Rahman, Sharma & Rahman, 2019). These studies generally aimed at contributing to a strengthened evidence base for policy and decision making.

A number of these 'diagnostic' studies draw attention to the 'mismatches' or 'misalignments' between TE and the labour market already discussed in Chapter 5, often providing important insights into the complex set of forces that are at play in shaping this misalignment (di Gropello et al., 2011; Rahman et al., 2019; Guerrero, 2014; Bawakyillenuo, Akoto, Ahiadeke, Aryeetey & Agbe, 2013). A number of the studies conclude that a crucial element of a way forward and addressing areas of misalignment is greater collaboration and synergy

between role players within TE, and with other development partners such as government and the private sector, including employers (UNESCO, 2013; Bawakyillenuo et al., 2013, Guerrero, 2014; Ndaruhutse & Thompson, 2016; GIZ, 2018). Other studies look at important mechanisms or processes that are seen as vital to strengthening TE systems and their components, such as the use of ICT and blended learning in strengthening TVET provision (Neal, 2011; Mabille, 2017), and the value of learning through the sharing of effective practices across institutions, countries or regions (Mihyo et al., 2011; Eicker et al., 2017).

While many of the 'diagnostic' studies discussed above emphasise the importance and value of partnerships and networks within TE and between TE and other development partners, other studies discuss how development co-operation is being used to build, strengthen and sustain partnerships and networks. A number of these studies drew attention to collaborative teaching programmes, often at the postgraduate level, aimed at strengthening the knowledge and skills base of one or more LLMIC, and usually involving TE institutions in North–South or North–South– South collaborations. These programmes may involve:

- the supported participation of students, including professionals already working, or TE staff from an LLMIC in a programme offered by a TE institution in the donor country, or in another middle- or high-income country (Kim et al., 2019)
- the active support of teaching staff from middle- or high-income countries in programmes offered by TE institutions within an LLMIC, including the professional development of staff teaching on these programmes (Almeida, Martinho & Lopes, 2012; Allen, 2014)

- programmes offered by TE institutions in an LLMIC that draw strongly from another programme, offer the curriculum of another programme, or are offered in partnership with a TE institution in a high- or middle-income country (Macphee & Fitz-Gerald, 2014; Amare et al., 2017)
- partnership initiatives that include a combination of these strategic interventions (Collins, 2013; Sharma, Thapa, Johansen, Dahlhaug & Støa, 2014; Sutrisno & Pillay, 2015; Watters, McCaig, Nagra & Kevau, 2019).

A strong focus of these initiatives is on enhancing training around critical skills, especially in relation to teachers or health professionals, including through the improved capacity of TE teaching staff responsible for developing these skills in their own country.

Some of these initiatives are supported and strengthened by specific research initiatives that also aim to build the research capacity of TE institutions in LLMICs. However, only a small number of studies reported on or made mention of the involvement of development aid in directly or indirectly contributing to research partnerships and networks between TE institutions in LLMICs and strengthening the scientific knowledge base in these countries through these networks (Cloete, Bailey & Pillay, 2011; Cloete, Maassen & Bailey, 2015). Some studies discussed or alluded to collaborative research partnerships between TE institutions in the global South and those in the North, (Collins, 2012).

A small number of studies suggested the use of external development aid to strengthen the capacity of TE institutions in other ways. This includes initiatives that have been aimed at strengthening the governance and leadership capacity of TE institutions

directly (Alemneh & Cornick, 2012) or through funding support to collaborative networks between TE institutions in LLMICs, which contribute in a number of ways to building institutional and regional TE capacity (Johnson, Hirt & Hoba, 2011). Some studies also outline development aid supporting broad TE systemic and institutional development processes in contexts with weak or damaged TE systems (Sharma et al., 2014). There are interesting examples in the literature where institutions have drawn on development aid to support innovative institutional initiatives, such as building the sustainability capacity of institutions (Munene, 2019) or building pedagogical capacity through the use of open educational resources (Murphy & Wolfenden, 2013).

This overview only provides a small snapshot of where and how development aid is directed towards strengthening the role of TE in development across LLMICs. However, the collection of studies mentioned here point to important ways in which development co-operation, particularly through building greater insight into TE systems and supporting collaboration and partnerships, is being used to link TE and development outcomes. While the literature also suggests that this role and the relationships that are enabled through such support require ongoing reflection, especially towards addressing the persistence of historical inequalities in complicating these relationships (Allen, 2014; Shahjahan, 2016) and forming relationships of epistemic injustice (Walker & Martinez-Vargas, 2020), the literature considered here suggests that external development aid remains an important leverage mechanism in the development of TE across LLMICs.

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14. These studies were also coded and analysed in relation to their evidence and thus form part of the analysis presented in Chapter 5.

7. Discussion, conclusions and recommendations

This final chapter provides a summary of the main findings of the review and addresses the research questions that informed the process. The research questions set out to investigate both the quantity and form of the evidence on the role of tertiary education in development in LLMICs. They asked what evidence exists of a direct or indirect relationship between the core functions of TE – teaching and learning, research, innovation, and engagement – and nine economic and non-economic development outcomes that we identified in the conceptual framework for the study. We considered what research methodologies have been used to generate the evidence, what gaps exist in the range of studies conducted, and what main insights emerge as conclusions from a synthesis of the evidence.

Our analysis of the evidence that informed this synthesis considered the relationship between TE and the nine development outcomes as one characterised by pathways to change that may be directed towards or lead to positive, negative/misaligned or mixed outcomes and may involve processes and relationships that are linear or complex. Our conclusions draw from this conceptual understanding of the role of TE in development.

We have also been interested to note what contextual enablers or constraints may impact on these pathways to change and to consider how development outcomes may feed back to strengthen the capacity of TE. Consideration of some additional studies, which were conceptually relevant to the concerns of the review but did not meet the evidence criteria for inclusion, has also drawn our

attention to the significance of attending to ethical frameworks in thinking about the relationship of TE and development and its relationship with forms of the state.

7.1 Main findings

7.1.1 The scope and strength of the evidence

Our conclusion from this review is that since 2010 a considerable body of literature has looked at the relationship between TE and development. This breadth was evident from our initial exploration of literature that resulted in a set of 1,434 studies that we regarded as meeting the conceptual criteria for this study. However, when this literature was considered more carefully, two limitations emerged. Many studies talked about the relationship between TE and development through the expression of an ideal or assertions about what should be happening or what was desired, rather than documenting what is happening. In addition, we found that many studies did not meet the evidence criteria for inclusion in the review, lacking either empirical or contextual detail in sufficient depth or dealing only with the internal processes of TE and not its outcomes or relationship to the broader society. Thus, after applying our evidence criteria to the literature, 170 studies were included for analysis in the review.

The scope of the evidence analysed for this review and the nature of content suggest the body of literature on TE and development has grown since Oketch et al.'s (2014) rigorous review of the impact of TE on development. That work considered 99 studies published

between 1990 and 2013. Although we slightly expanded the evidence criteria for this study, the larger number of studies that met our criteria for inclusion, published over a shorter period (2010–20), indicates an expansion of research in this area. However, the overview of the evidence provided in Chapter 4 shows that this growth has not been even across regions, even if the limitations created by language are acknowledged. The literature is also skewed towards studies of lower-middle-income countries, rather than low-income countries.

The studies included in this review are unevenly distributed across the nine different development outcomes. As the synthesis in Chapter 5 shows, the body of evidence dealing with the economic outcomes of TE is far greater than that of any other development outcome, a feature also noted by Oketch et al. (2014). Thus, many studies focus on the economic outcomes of TE, stressing broad economic returns and the economic impacts of graduate knowledge and skill. However, in the period since that review, there has been some growth in the body of evidence on 'non-economic' development outcomes, suggesting some attention to the political and social impacts of TE, especially those that deal with the relationship between TE and equitable and sustainable relationships, and the role of TE in strengthening institutions and in building a robust civil society. However, the evidence base still appears relatively small in relation to TE's role in sectors associated with redressing poverty and delivering basic services like education, including the training of

professionals to deliver these services. There is also still only a small body of literature on the role of TE in LLMICs in the development of new knowledge and innovation, linked to the research function of institutions.

7.1.2 The core functions of TE

Of the core functions of TE, the vast majority of studies in this review deal with the teaching and learning function of TE, a pattern also noted by Oketch et al. (2014). A sizeable number of studies in this review looked at engagement as a core function of TE. As discussed in Chapter 5, this is important for TE's role in the 'non-economic' elements of development and links especially to the value of collaboration and partnerships in taking forward this role. However, as already noted, this review highlights how little scholarship there has been on the relationship between development outcomes in LLMICs and research and innovation linked with TE in those countries, suggesting under-development of this function in these countries.

7.1.3 The methodologies in use

The majority of studies included in this review used quantitative methods (see Chapter 4). This is partly associated with the large number of studies of the economy included in this review, many of which use a standard methodology associated, for example, with Mincerian equations or other forms of statistical relationship. Qualitative research, mixed-methods studies and rigorous literature reviews underpin a much smaller body of scholarship in this area, including the scholarship on non-economic outcomes. Our findings

suggest that there is considerable scope for methodological triangulation – that is, studying the same development outcome using two or three complementary methods to establish internal and external validity with greater rigour. There is also scope for more comparative studies using a broader range of methods from comparative education, looking at how policy innovations change when introduced in different contexts or settings and how particular societies engage with ethical ideas, for example public good or human development.

7.2 Main themes across the literature reviewed

Three main themes emerge from this review of the literature concerning the nature of the relationship between TE and development outcomes in LLMICs. The first is that the TE sectors across LLMICs are not fully realising their potential with regard to their role in development, looking across a wide range of economic and non-economic development outcomes. Limitations with regard to fulfilling this potential centre on miscommunication, misalignment or missed opportunities to engage with socio-cultural and political processes that could strengthen TE's role in development. The implication of this is not less, but better engaged TE, and enhancing the social, political and economic facets of the ecology that supports TE. This requires understanding TE's role in development as a two-way process between TE and a range of partners and role players across a wide spectrum of policies and practice that enhance communication and collaboration.

A second theme concerns some of the ways in which the effects of TE on development may be under-appreciated. This is partly because the literature selected for this review is strongly oriented to documenting the links, direct or indirect, which are evident between TE institutions or the TE system and particular development outcomes. However, many underlying conditions of a society with regard to health, levels of education, infrastructural provision and institutional development are all in some ways associated with the outcomes of TE, even if the pathway of connection cannot be precisely plotted or took place in a previous historical period. The Covid-19 epidemic has alerted us to the importance of epidemiology, engineering, vaccine trials and discussion of social policy in an interconnected world, all of which require high levels of input from TE with other partners. TE cannot prevent terrible epidemics or future disasters, but it has an important role to play in helping people prepare better and support each other through these periods. This relationship is not easy to document using the methods of a rigorous literature review. However, it is a feature to attend to in thinking about enablers and constraints and the ways in which context is an important feature in understanding both what is positive or misaligned in the relationship of TE and development outcomes.

A third theme concerns the nature of research. We have noted throughout this review how the largest proportion of studies included is on the richest of the LLMICs, how the biggest body of evidence relates to aggregate economic growth or the earnings of

graduates, and how limited the scholarship is on research and innovation. It appears to us there is an enormous job to be done on building research capacity, research environments and supporting investigation of the view from below, whether this is documenting more extensively TE in the poorest countries, investigating the relationships of TE with non-elite groups, or researching interventions that seek to reduce, rather than widen, economic or social inequalities. Here, too, the implication is not less TE, but more TE with better support for the research, innovation and engagement pillars, and their connections to teaching and learning.

We look at some aspects of these themes in more detail, highlighting the ways in which they were evident in the review.

Mismatch

The problem of 'mismatch' occurred repeatedly across the literature. This relates to what is being taught in TE institutions and what is needed (or perceived to be needed) in practice. A number of studies grouped under the development outcome of graduate skill and knowledge comment on graduates being out of step with the needs of the labour market. Critiques are levelled at TE for the lack of productivity of graduates. The sector's incapacity to generate appropriate skills was also an important thread in the discussion of economic growth. In works on the relationship with basic education, a number of studies comment on TE not contributing through the training of teachers to effective and appropriate practice in classrooms. Works on equitable and sustainable relationships also point out that these are not always well developed through TE. Most of the

studies on the production of new knowledge highlight how this is not responsive enough to environmental conditions, community needs or the complexities of context. These studies highlight that TE may be misaligned, but there is little corroboration from other studies of the same sector under different conditions of collaboration or communication. This body of work highlights a problem, but there is still much more work to be done on the nature of the solution and what kind of responsibility is to be taken by TE, what forms or relationships need to be built with development partners, and how processes of communication and collaboration can be enhanced.

In relation to poverty reduction, although this is a small segment of the literature reviewed, the studies do show a positive relationship, or match, between TE and engagements with poverty reduction, as do a number of studies of specific interventions around teacher education and other forms of professional development. Some better kinds of 'match', alignment or connection thus appear worth investigating or supporting through other kinds of collaboration. The causes of 'mismatch', and to what extent these lie in the relationship of TE with certain sectors, certain kinds of employers or partnerships, or certain kinds of methods, also appear to be a fruitful area for exploration.

The value and importance of partnerships and networks

The research reviewed supports the value and importance of partnerships and networks, both between TE institutions and with other kinds of organisations and institutions. Virtually all the studies of collaboration – intra-institutional, inter-institutional or

between institutions and organisations, and between countries – identify some aspect of a positive development outcome. However, this is often mixed, as the evidence shows how contextual factors, relationships or processes may undermine the effectiveness of such partnerships. Sustaining all forms of partnership linked to teaching and learning, research, innovation and engagement, and supporting initiatives around equity, citizenship or sustainability, or working on poverty or vulnerability seem particularly fruitful areas for further work. These talk to both the areas where research supports positive relationships between a number of overlapping development outcomes, and addressing some of the ways in which research identifies how existing inequalities make the development outcomes of TE mixed, misaligned or negative.

Weakness of research function/capacity

This review highlights the difficulties for TE in LLMICs in developing the ecology for research. Of the four pillars of TE reviewed, the smallest segment of studies deal with research. The conclusion from the studies was that the research relationships were shown to be weak and/or out of step with the social, political, environmental, health or economic needs of the countries. The reasons for this need closer investigation, possibly following some of the groundwork done in the studies of African flagship universities (Cloete et al., 2011, 2015), and taking on board a wider range of TE institutions, a wider understanding of research partnerships, and some of the issues highlighted in thinking about various mismatches illuminated in this study. The wide range of countries and issues

where there is minimal research, and the limited range of methods used, all draw attention to the importance of building research capacity, research collaborations and dialogues, research ecologies, and connecting this with some of the major development frameworks such as the SDGs, national or regional vision statements, and important ethical orientations associated with human development and sustainability,

Enablers and constraints

With regard to enablers, a large number of studies of economic growth posit growth, a rise in income among a middle class and government policy as enablers of the expansion of TE. However, other vital enablers associated with both the economic and non-economic development outcomes in the studies reviewed identify the expansion of TE to 'non-traditional' participants – women, SC and ST in India, indigenous groups, students of lower socioeconomic status – as crucial to their advancing political and social demands, ensuring pathways out of poverty, and investing back in local regions. The institutional form of TE, its openness, organisational form and responsiveness to context appears to create another vital set of enablers. In the literature reviewed for this study this is sometimes linked with the openness to curriculum innovation, to collaborations with other related institutions or interested organisations, to the mobility of students and staff, to partnerships around research or community engagement, and the capacity to recognise and address gender-based violence or the exclusion of particular groups. However, when the institutional form fails to be

responsive to ideas about public good, this can be a constraint. Constraints are also evident when TE becomes enmeshed with the economic strategies of elites or processes of exclusion or discrimination.

The works in this study highlight that development outcomes associated with growth, equitable social relationships and institutional form all feedback into TE in a positive way. However, many features of the context can frustrate this process or orient it away from some of the ethical orientation to human development and sustainability.

Constraints on development outcomes are associated with the reproduction in TE of the race, gender, caste or regional inequalities of a society, and the inadequacies of TE to transform these. Some of these hierarchies are also noted in relation to cross-national initiatives. Constraints also relate to some inadequacies for TE to successfully mediate and engage appropriately with the perceptions of employers, providers of basic services like schooling, social activists, excluded communities, or linked institutions where graduates' knowledge or skill, productivity or capacity for innovation may be out of step. There are only a handful of studies of how positive initiatives around equitable relationships or responding to the needs of a community of practice map back into TE.

Revisiting our conceptual diagram in the light of the review, the nine development outcomes we identified appear generally adequate to represent the kinds of development outcomes documented in the literature. However, we are aware that some of the constraints and enablers may be much

more general than the designated development outcomes, for example a healthy population, a safe environment, social policy oriented to addressing inequality, a free press and freedom of movement. Some of these issues are addressed in the literature we have discussed in Chapter 6, and we consider the need to build into the diagram as an outer layer of concern an envelope or ecology of policy and practice and relationships with the state that is more general than the specific pathways identified by this review. We are also concerned that our diagram understated responsibilities of TE for sustainability, public good and human development – all themes the conceptual literature discussed in Chapter 6 draws attention to.

We began this review as the Covid-19 pandemic began and have conducted the review acutely aware of the ways in which political economies, education institutions and development outcomes in all the countries we have been looking at are being changed profoundly by the health, economic, environmental and educational crises, with their attendant suffering. These crises lay bare the consequences of decades of intersecting inequalities, and in some of the richest countries of the world show how some universities, classified as centres of excellence, have not been able, either through research or teaching, to adequately help protect the weakest and most vulnerable. This suggests that it is even more important that in the period going forward the TE sectors in LLMICs are supported and strengthened to enhance their contribution to development and build the relationships that will enable this to happen.

References and further reading

7.3 Recommendations

Drawing on the insights gained from this rigorous review of the literature on the role of TE in LLMICs, the following recommendations are proposed.

• Taking account of the under-recognition of the importance of TE for development, initiate programmes and projects that comprise research, policy dialogue and practice initiatives which recognise that **the role of TE in development is a two-way process**, involving a wide range of actors, relationships and institutions. Support more 'joined-up' and reflective processes of discussion and reviews of research, policy and practice between TE and other sectors to enhance the depth of insights gained and support a positive normative orientation for development outcomes.

• Develop in partnership with TE institutions and researchers in LLMICs a **comprehensive research programme** aimed at building a strong evidence base to inform policy and practice, sensitive to local contexts and needs: This research programme needs to be accompanied by a sustained and long-term programme of building research capacity and a research ecology. In planning a comprehensive research programme, the following research priorities are recommended:

– studies that *empirically explore TE's role in contributing to the full range of development outcomes*, particularly 'non-economic' ones and the interconnections between different development outcomes

– studies that explore how and why the *processes of change* between TE and development outcomes may become misaligned or contribute to negative outcomes, and how a process of change that leads to positive development outcomes can be strengthened and sustained

– studies that seek to deepen understanding of the location of the *TE sector and particular institutions within a wider political, economic and socio-cultural context*, documenting the nature of the relationships between TE and other institutional formations, including development co-operation partners and how these support or hinder contributions to development outcomes.

• Promote the **use of a wide range of research methods** for studying the relationship between TE and development outcomes, supporting studies that triangulate different methods or apply comparative approaches to deepen insights and enhance validity.

• Strengthen the research capacity of LLMICs through the development of **strong and sustainable collaborative research partnerships and networks** across LLMICs and between LLMICs and other middle- or high-income countries, ensuring that these partnerships build a research ecology responsive to different voices and kinds of knowledge and able to generate research findings that are relevant and appropriate to local contexts and needs.

• Build and support projects, processes and systems for the **effective dissemination of research findings** on the role of the TE in the development of LLMICs, ensuring that the evidence produced is used to strengthen policy dialogue and support practical local initiatives and change processes.

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Appendices

Appendix 1: Overview of research evidence

Citation	Type of source	Country and region	Method	1st development outcome	Core function of TE	Pathway to change
1. Afzal, Rehman, Farooq & Sarwar (2011)	Journal article	Pakistan, South Asia	Quantitative (application of statistical method)	Economic growth	Teaching and learning	Positive and linear
2. Agabi, Obasi & Ohia (2012)	Journal article	Nigeria, Sub-Saharan Africa	Quantitative (survey report)	Graduate skill and knowledge	Teaching and learning	Misaligned and linear
3. Agbor (2015)	Journal article	Multi-countries, Sub-Saharan Africa	Quantitative (application of statistical method)	Equitable relationships	Teaching and learning	Mixed and complex
4. Agesa, Agesa & Dabalen (2013)	Journal article	Kenya, Sub-Saharan Africa	Quantitative (application of statistical method)	Economic growth	Teaching and learning	Mixed and complex
5. Agrawal (2012)	Journal article	India, South Asia	Quantitative (application of statistical method)	Economic growth	Teaching and learning	Positive and linear
6. Ahmed & Chattopadhyay (2016)	Journal article	India, South Asia	Quantitative (application of statistical method)	Economic growth	Teaching and learning	Misaligned and linear
7. Akinyemi (2012)	Journal article	Nigeria, Sub-Saharan Africa	Quantitative (application of statistical method)	Equitable relationships	Teaching and learning	Mixed and linear
8. Akono & Nanfosso (2013)	Journal article	Cameroon, Sub-Saharan Africa	Quantitative (application of statistical method)	Economic growth	Teaching and learning	Positive and linear
9. Akyeampong, Lussier, Pryor & Westbrook (2013)	Journal article	Multi-countries, Sub-Saharan Africa	Mixed method (quant survey and qualitative method)	Strengthened basic education provision	Teaching and learning	Misaligned and complex
10. Al Amin & Greenwood (2018)	Journal article	Bangladesh, South Asia	Mixed method (quant survey and qualitative method)	Strengthened basic education provision	Teaching and learning	Misaligned and complex
11. Alagumalai, Kadambi & Appaji (2019)	Journal article	India, South Asia	Mixed method (quant survey and qualitative methods)	Graduate skill and knowledge	Teaching and learning	Misaligned and linear
12. Alaref, Brodmann & Premand (2020)	Journal article	Tunisia, Middle East and North Africa	Quantitative (Random control trial)	Economic growth	Teaching and learning/ Engagement	Misaligned and complex
13. Allen (2014)	Journal article	Multi-LLMIC regions	Quantitative (survey report)	Economic growth	Teaching and learning	Mixed and complex
14. Alshamy (2016)	Journal article	Egypt, Middle East and North Africa	Mixed method (quant survey and qualitative method)	Strengthened basic education provision	Teaching and learning	Misaligned and linear
15. Amadi & Ememe (2013)	Book/ chapter	Nigeria, Sub-Saharan Africa	Mixed method (quant survey and qualitative method)	Graduate skill and knowledge	Teaching and learning	Misaligned and complex
16. Amaghionyeodiwe & Osinubi (2012)	Journal article	Nigeria, Sub-Saharan Africa	Quantitative (application of statistical method)	Economic growth	Teaching and learning	Positive and linear
17. Amare, Lutale, Derbew, Mathai & Langeland (2017)	Journal article	Multi-countries, Sub-Saharan Africa	Mixed method (quant survey and qualitative method)	Enhanced professional knowledge and skill among all workers	Teaching and learning/ Engagement	Positive and complex
18. Amegbor & Rosenberg (2019)	Journal article	Uganda, Sub-Saharan Africa	Quantitative (application of statistical method)	Equitable relationships	Teaching and learning	Mixed and complex
19. Amutuhaire (2013)	Book/ chapter	Uganda, Sub-Saharan Africa	Qualitative (Interviews)	Equitable relationships	Teaching and learning/ Innovation/ Engagement	Mixed and linear
20. Asafu-Adjaye (2012)	Journal article	Ghana, Sub-Saharan Africa	Quantitative (application of statistical method)	Economic growth	Teaching and learning	Positive and linear
21. Asghar & Zahra (2012)	Journal article	Pakistan, South Asia	Quantitative (application of statistical method)	Poverty reduction and development of sustainable livelihoods	Teaching and learning/ Research	Misaligned and linear
22. Asongu & Nwachukwu (2016)	Journal article	Multi-countries, Sub-Saharan Africa	Quantitative (application of statistical method)	Equitable relationships	Teaching and learning	Positive and linear
23. Auturupane, Gunatilake, Shojo & Ebenezer (2013)	Report	Afghanistan, South Asia	Quantitative (application of statistical method)	Economic growth	Not clear	Positive and complex
24. Awad, Halid & Yussof (2013)	Journal article	Multi-countries, Middle East and North Africa	Quantitative (application of statistical method)	Economic growth	Teaching and learning	Positive and linear

Citation	Type of source	Country and region	Method	1st development outcome	Core function of TE	Pathway to change
25. Ayoubi, Alzarif & Khalifa (2017)	Journal article	Syria, Middle East and North Africa	Qualitative (interviews)	Graduate skill and knowledge	Teaching and learning	Misaligned and complex
26. Azam (2010)	Journal article	India, South Asia	Quantitative (application of statistical method)	Economic growth	Teaching and learning	Positive and linear
27. Azam (2012)	Report	India, South Asia	Quantitative (application of statistical method)	Economic growth	Teaching and learning	Mixed and Linear
28. Baily (2015)	Journal article	India, South Asia	Qualitative (combination of qualitative methods)	Equitable relationships	Teaching and learning	Misaligned and complex
29. Banerjee (2016)	Journal article	India, South Asia	Quantitative (application of statistical method)	Economic growth	Teaching and learning	Mixed and complex
30. Barsoum & Rashad (2018)	Journal article	Egypt, Middle East and North Africa	Quantitative (application of statistical method)	Economic growth	Teaching and learning	Mixed and linear
31. Bawakyillenuo, Akoto, Ahiadeke, Aryeetey & Agbe (2013)	Report	Ghana, Sub-Saharan Africa	Mixed method (quant survey and qualitative method)	Economic growth	Teaching and learning	Misaligned and complex
32. Boccanfuso, Larouche & Trandafir (2015)	Journal article	Senegal, Sub-Saharan Africa	Quantitative (application of statistical method)	Economic growth	Teaching and learning	Positive and complex
33. Brossard, Coury & Mambo (2010)	Report	Malawi, Sub-Saharan Africa	Mixed method (application of stats method and qualitative method)	Economic growth	Teaching and learning	Mixed and linear
34. Buenviaje, del Mundo, Añonuevo & Martinez (2015)	Journal article	Philippines, East Asia and Pacific	Quantitative (survey report)	Graduate skill and knowledge	Teaching and learning	Positive and linear
35. Buzdar, Jalal & Mohsin (2018)	Journal article	Pakistan, South Asia	Quantitative (survey report)	Strengthened basic education provision	Teaching and learning	Misaligned and complex
36. Capuano & Marfouk (2013)	Journal article	Multi-countries, Sub-Saharan Africa	Quantitative (application of statistical method)	Economic growth	Teaching and learning	Misaligned and linear

Citation	Type of source	Country and region	Method	1st development outcome	Core function of TE	Pathway to change
37. Castel, Phiri & Stampini (2010)	Report	Malawi, Sub-Saharan Africa	Quantitative (application of statistical method)	Economic growth	Teaching and learning	Positive and linear
38. Cloete, Bailey & Pillay (2011)	Report	Multi-countries Sub-Saharan Africa	Mixed method (application of stats method and qualitative method)	New knowledge that contributes to technological and social innovation	Teaching and learning/ Research/ Innovation/ Engagement	Mixed and complex
39. Cloete, Maassen & Bailey (2015)	Book/ chapter	Multi-countries, Sub-Saharan Africa	Mixed method (quant survey and qualitative method)	New knowledge that contributes to technological and social innovation	Teaching and learning/ Research	Mixed and complex
40. Coffie (2014)	Journal article	Liberia, Sub-Saharan Africa	Qualitative (combination of methods)	Graduate skill and knowledge	Teaching and learning	Mixed and complex
41. Collins (2012)	Journal article	Rwanda, Sub-Saharan Africa	Qualitative (interviews)	Poverty reduction and development of sustainable livelihoods	Innovation/ Engagement	Positive and complex
42. Dahal (2010)	Journal article	Nepal, South Asia	Quantitative (application of statistical method)	Economic growth	Teaching and learning	Positive and linear
43. Darvas, Ballal & Feda (2014)	Journal article	Multi-countries, Sub-Saharan Africa	Quantitative (application of statistical method)	Equitable relationships	Teaching and learning	Mixed and complex
44. Datta & Saad (2011)	Journal article	India, South Asia	Qualitative (combination of methods)	New knowledge that contributes to technological and social innovation	Research/ Innovation	Mixed and complex
45. Dauda (2011)	Journal article	Nigeria, Sub-Saharan Africa	Quantitative (application of statistical method)	Economic growth	Teaching and learning	Positive and linear
46. di Gropello, Tandon & Yusef (2011)	Report	Multi-countries, East Asia and Pacific	Mixed method (Quant survey and qualitative method)	Economic growth	Teaching and learning/ Research	Mixed and complex
47. Diawara & Mughal (2011)	Journal article	Senegal, Sub-Saharan Africa	Quantitative (application of statistical method)	Economic growth	Teaching and learning	Mixed and linear

Citation	Type of source	Country and region	Method	1st development outcome	Core function of TE	Pathway to change
48. Driouchi & Zouag (2011)	Report	Morocco, Middle East and North Africa	Quantitative (mixed quant methods)	Economic growth	Teaching and learning/ Innovation/ Engagement	Positive and linear
49. Duerrenberger & Warning (2018)	Journal article	Multi-LLMIC regions	Quantitative (application of statistical method)	Strong and engaged civil society	Unclear	Mixed and complex
50. Duong, Wu & Hoang (2019)	Journal article	Vietnam, East Asia and Pacific	Quantitative (survey report)	Graduate skill and knowledge	Teaching and learning	Mixed and complex
51. Dutta & Islam (2017)	Journal article	Bangladesh, South Asia	Mixed method (Quant survey and qualitative method)	Economic growth	Teaching and learning/ Innovation/ Engagement	Mixed and complex
52. El Alaoui (2015)	Journal article	Multi-countries, Middle East and North Africa	Quantitative (application of statistical method)	Economic growth	Teaching and learning	Positive and linear
53. El Hadidi & Kirby (2017)	Journal article	Egypt, Middle East and North Africa	Quantitative (survey report)	New knowledge that contributes to technological and social innovation	Innovation/ Engagement	Misaligned and complex
54. Etshim (2017)	Journal article	DRC, Sub-Saharan Africa	Quantitative (survey report)	Graduate skill and knowledge	Teaching and learning	Mixed and complex
55. Evoh, Mugimu & Chavula (2014)	Book/ chapter	Multi-countries, Sub-Saharan Africa	Qualitative (combination of methods)	Economic growth	Teaching and learning/ Research	Mixed and complex
56. Fasih, Kingdon, Patrinos, Sakellariou & Soderbom (2012)	Report	Multi-LLMIC regions	Quantitative (application of statistical method)	Economic growth	Teaching and learning	Positive and linear
57. Fongwa & Wangenge-Ouma (2015)	Journal article	Cameroon, Sub-Saharan Africa	Quantitative (combination of methods)	Economic growth	Engagement	Positive and complex
58. Frisancho & Krishna (2016)	Journal article	India, South Asia	Quantitative (application of statistical method)	Economic growth	Teaching and learning	Mixed and complex
59. Gebel & Baranowska-Rataj (2012)	Journal article	Ukraine, Europe and Central Asia	Quantitative (survey report)	Economic growth	Teaching and learning	Mixed and linear
60. George & Setubatuba (2017)	Journal article	Lesotho, Sub-Saharan Africa	Qualitative (case study)	Graduate skill and knowledge	Teaching and learning	Mixed and linear

Citation	Type of source	Country and region	Method	1st development outcome	Core function of TE	Pathway to change
61. Gokuladas (2010)	Journal article	India, South Asia	Quantitative (application of statistical method)	Graduate skill and knowledge	Teaching and learning	Mixed and complex
62. Gondo & Dafuleya (2010)	Journal article	Ethiopia, Sub-Saharan Africa	Qualitative (interviews)	Economic growth	Teaching and learning/ Engagement	Misaligned and complex
63. Goyet, Touch, Ir, SamAn, Fassier, Frutos & Barennes (2015)	Journal article	Cambodia, East Asia and Pacific	Rigorous review	New knowledge that contributes to technological and social innovation	Research/ Innovation	Mixed and linear
64. Gyimah-Brempong (2011)	Journal article	Multi-countries, Sub-Saharan Africa	Quantitative (application of statistical method)	Economic growth	Teaching and learning	Positive and linear
65. Hailemariam (2018)	Journal article	Multi-LLMICs	Quantitative (application of statistical method)	Economic growth	Teaching and learning	Positive and linear
66. Hardman, Abd-Kadir & Tibuhinda (2012)	Journal article	Tanzania, Sub-Saharan Africa	Mixed method (quant survey and qualitative methods)	Strengthened basic education provision	Teaching and learning	Misaligned and complex
67. Hong & Kim (2019)	Journal article	Myanmar, East Asia and Pacific	Qualitative (combination of more than one qualitative method)	Strong and engaged civil society	Engagement	Positive and complex
68. Husain & Osswald (2016)	Journal article	Bangladesh, South Asia	Qualitative (combination of qualitative methods)	Strengthened and transformed institutions	Teaching and learning/ Engagement	Misaligned and complex
69. Ilavarasan, Kar & Aswani (2017)	Report	Multi-countries, South Asia	Rigorous review	Economic growth	Teaching and learning/ Engagement	Positive and linear
70. Ilie & Rose (2018)	Journal article	Multi-LLMIC regions	Quantitative (application of statistical method)	Equitable relationships	Teaching and learning/ Engagement/ Innovation/ Research	Misaligned and complex
71. Islam, Jantan, Hunt, Rahman & Abdullah (2019)	Journal article	Bangladesh, South Asia	Qualitative (interviews)	Economic growth	Teaching and learning	Mixed and complex
72. Iwakuni (2017)	Journal article	Rwanda, Sub-Saharan Africa	Qualitative (combination of qualitative methods)	Strengthened basic education provision	Teaching and learning	Misaligned and complex

Citation	Type of source	Country and region	Method	1st development outcome	Core function of TE	Pathway to change
73. Jacob (2018)	Journal article	India, South Asia	Quantitative (application of statistical method)	Economic growth	Teaching and learning	Mixed and linear
74. Jha & Dang (2012)	Journal article	Timor-Leste, East Asia and Pacific	Quantitative (survey report)	Poverty reduction and development of sustainable livelihoods	Teaching and learning	Positive and linear
75. Johnson (2013)	Journal article	Kenya, Sub-Saharan Africa	Qualitative (case study)	Strong and engaged civil society	Engagement	Positive and complex
76. Johnson (2017)	Journal article	Multi-countries, Sub-Saharan Africa	Qualitative (case study)	Equitable relationships	Teaching and learning/ Engagement	Mixed and complex
77. Johnson, Hirt & Hoba (2011)	Journal article	Multi-countries, Sub-Saharan Africa	Qualitative (case study)	Strengthened and transformed institutions	Engagement	Positive and complex
78. Jonbekova (2015)	Journal article	Tajikistan, Europe and Central Asia	Qualitative (interviews)	Graduate skill and knowledge	Teaching and learning	Misaligned and complex
79. Kaino, Mtetwa & Kasanda (2014)	Journal article	Multi-countries, Sub-Saharan Africa	Mixed method (quant survey and qualitative methods)	New knowledge that contributes to technological and social innovation	Innovation/ Engagement	Misaligned and linear
80. Kamat (2011)	Book/ chapter	India, South Asia	Qualitative (historical policy analysis)	Economic growth	Innovation	Misaligned and complex
81. Kanayo (2013)	Journal article	Nigeria, Sub-Saharan Africa	Quantitative (application of statistical method)	Economic growth	Teaching and learning	Positive and linear
82. Karina, Gunawan, Stoffers, Sunanto & Byomantara (2017)	Journal article	Indonesia, East Asia and Pacific	Mixed method (quant survey and qualitative methods)	Economic growth	Teaching and learning	Mixed and complex
83. Kim, Kim & Shin (2019)	Journal article	Lao PDR, East Asia and Pacific	Mixed method (application of stats method and qualitative method)	Enhanced professional knowledge and skill among all workers	Teaching and learning	Positive and complex
84. Kimenyi (2011)	Journal article	Multi-LLMIC regions	Quantitative (application of statistical method)	Economic growth	Teaching and learning	Positive and linear

Citation	Type of source	Country and region	Method	1st development outcome	Core function of TE	Pathway to change
85. Kintu, Kitainge & Ferej (2019)	Journal article	Uganda, Sub-Saharan Africa	Quantitative (survey report)	Graduate skill and knowledge	Teaching and learning	Mixed and complex
86. Kirby & El Hadidi (2019)	Journal article	Egypt, Middle East and North Africa	Mixed method (quant survey and qualitative methods)	Economic growth	Innovation/ Engagement	Misaligned and complex
87. Kirui (2018)	Journal article	Multi-countries, Sub-Saharan Africa	Quantitative (mixed quantitative method)	Economic growth	Teaching and learning	Positive and linear
88. Kitawi (2014)	Journal article	Kenya, Sub-Saharan Africa	Qualitative (combination of more than one qualitative method)	Equitable relationships	Engagement	Mixed and complex
89. Kleibert (2015)	Journal article	Philippines, East Asia and Pacific	Qualitative (interviews)	Economic growth	Teaching and learning/ Engagement	Mixed and complex
90. Krafft, Branson & Flak (2019)	Journal article	Multi-countries, Middle East and North Africa	Quantitative (application of statistical method)	Economic growth	Teaching and learning	Positive and linear
91. Krishnan & Shaorshadze (2013)	Report	Ethiopia, Sub-Saharan Africa	Rigorous review	Economic growth	Teaching and learning	Mixed and complex
92. Kruss, Adeoti & Nabudere (2012)	Journal article	Multi-countries, Sub-Saharan Africa	Mixed method (quant survey and qualitative methods)	New knowledge that contributes to technological and social innovation	Innovation	Mixed and complex
93. Kusaeri & Aditomo (2019)	Journal article	Indonesia, East Asia and Pacific	Quantitative (survey report)	Strengthened basic education provision	Teaching and learning	Mixed and complex
94. Lahire, Johanson & Wilcox (2011)	Report	The Gambia, Sub-Saharan Africa	Mixed method (quant survey and qualitative methods)	Enhanced professional knowledge and skill among all workers	Teaching and learning	Mixed and complex
95. Larbi-Apau & Sarpong (2010)	Journal article	Ghana, Sub-Saharan Africa	Quantitative (survey report)	Economic growth	Teaching and learning	Positive and linear
96. Lashari, Bhutto, Rashdi & Qureshi (2015)	Journal article	Pakistan, South Asia	Mixed method (quant survey and qualitative methods)	New knowledge that contributes to technological and social innovation	Research/ Innovation	Misaligned and complex

Citation	Type of source	Country and region	Method	1st development outcome	Core function of TE	Pathway to change
97. Lopes, Costa & Matias (2016)	Journal article	Angola, Sub-Saharan Africa	Mixed method (Quant survey and qualitative method)	Strengthened basic education provision	Teaching and learning	Positive and complex
98. Luescher-Mamashela & Kiiru (2011)	Book/chapter	Multi-countries, Sub-Saharan Africa	Mixed method (quant survey and qualitative methods)	Strong and engaged civil society	Engagement	Positive and complex
99. Luescher-Mamashela & Mugume (2014)	Journal article	Multi-countries, Sub-Saharan Africa	Qualitative (historical policy analysis)	Strong and engaged civil society	Engagement	Mixed and complex
100. Magara, Bukirwa & Kayiki (2011)	Journal article	Uganda, Sub-Saharan Africa	Qualitative (combination of more than one qualitative method)	Strengthened and transformed institutions	Engagement	Positive and linear
101. Majgaard & Mingat (2012)	Report	Multi-countries, Sub-Saharan Africa	Quantitative (application of statistical method)	Poverty reduction and development of sustainable livelihoods	Teaching and learning	Mixed and linear
102. Malik & Courtney (2011)	Journal article	Pakistan, South Asia	Mixed method (quant survey and qualitative methods)	Equitable relationships	Teaching and learning	Positive and complex
103. Malik, Khan, Chofreh, Goni, Klemeš & Alotaibi, (2019)	Journal article	Pakistan, South Asia	Mixed method (quant survey and qualitative methods)	Graduate skill and knowledge	Teaching and learning	Misaligned and linear
104. Massaquoi, Tarawally, Bangali & Kandeh (2014)	Journal article	Sierra Leone, Sub-Saharan Africa	Mixed method (quant survey and qualitative methods)	Enhanced professional knowledge and skill among all workers	Teaching and learning	Misaligned and complex
105. Mattes & Luescher-Mamashela (2012)	Journal article	Multi-countries, Sub-Saharan Africa	Mixed method (quant survey and qualitative methods)	Strong and engaged civil society	Teaching and learning/ Engagement	Positive and complex
106. Mbah (2015)	Journal article	Cameroon, Sub-Saharan Africa	Qualitative (case study)	Poverty reduction and development of sustainable livelihoods	Engagement	Mixed and complex

Citation	Type of source	Country and region	Method	1st development outcome	Core function of TE	Pathway to change
107. McNae & Vali (2015)	Journal article	Papua New Guinea, East Asia and Pacific	Qualitative (interviews)	Equitable relationships	Teaching and learning/ Research/ Innovation/ Engagement	Misaligned and complex
108. Mehrotra, Gandhi & Sahoo (2014)	Book/chapter	India, South Asia	Quantitative (survey report)	Economic growth	Teaching and learning	Misaligned and linear
109. Mihyo, Hammond, Makhoka & Tjihenuna (2011)	Report	Multi-countries, Sub-Saharan Africa	Qualitative (case study)	Enhanced professional knowledge and skill among all workers	Teaching and learning/ Engagement	Positive and linear
110. Milton & Barakat (2016)	Journal article	Multi-LLMIC regions	Qualitative (historical policy analysis)	Equitable relationships	Teaching and learning/ Engagement	Mixed and complex
111. Mitra (2015)	Journal article	India, South Asia	Quantitative (application of statistical method)	Economic growth	Teaching and learning	Mixed and linear
112. Mitra (2019)	Journal article	India, South Asia	Quantitative (application of statistical method)	Economic growth	Teaching and learning	Mixed and complex
113. Moono & Rankin (2013)	Report	Zambia, Sub-Saharan Africa	Mixed method (application of stats method and qualitative method)	Graduate skill and knowledge	Teaching and learning	Misaligned and complex
114. Morley (2011)	Journal article	Multi-countries, Sub-Saharan Africa	Qualitative (interviews)	Equitable relationships	Teaching and learning	Misaligned and complex
115. Morley (2012)	Journal article	Multi-countries, Sub-Saharan Africa	Mixed method (quant survey and qualitative method)	Equitable relationships	Teaching and learning	Misaligned and complex
116. Mulu (2017)	Journal article	Ethiopia, Sub-Saharan Africa	Qualitative (case study)	Economic growth	Research/ Innovation	Misaligned and linear
117. Murphy & Wolfenden (2013)	Journal article	Kenya, Sub-Saharan Africa	Qualitative (interviews)	Strengthened basic education provision	Teaching and learning/ Engagement	Positive and complex
118. Nazier (2013)	Journal article	Egypt, Middle East and North Africa	Quantitative (application of statistical method)	Economic growth	Not clear	Misaligned and complex

Citation	Type of source	Country and region	Method	1st development outcome	Core function of TE	Pathway to change
119. Ndaruhutse & Thompson (2016)	Report	Multi-LLMIC regions	Rigorous review	Economic growth	Teaching and learning/ Research/ Engagement	Mixed and complex
120. Nguyen Thi Mai & Hall (2017)	Journal article	Vietnam, East Asia and Pacific	Mixed method (quant survey and qualitative method)	Strengthened basic education provision	Teaching and learning	Mixed and complex
121. Niyibizi, Sibomana, Niyomugabo, Yanzigiye, Jean de Dieu & Perumal (2018)	Journal article	Rwanda, Sub-Saharan Africa	Combination of more than one qualitative method	Graduate skill and knowledge	Teaching and learning	Misaligned and complex
122. Nomura, Rahman, Goyal, Nakata & Al-Zayed (2015)	Report	Bangladesh, South Asia	Mixed method (quant survey and qualitative method)	Graduate skill and knowledge	Teaching and learning	Mixed and complex
123. Nsowah-Nuamah, Teal & Awoonor-Williams (2012)	Journal article	Ghana, Sub-Saharan Africa	Quantitative (survey report)	Economic growth	Teaching and learning	Mixed and linear
124. Nyarko (2014)	Book/ chapter	Multi-countries, Sub-Saharan Africa	Combination of quantitative methods	Economic growth	Teaching and learning	Positive and linear
125. O'Keeffe (2016)	Journal article	Ethiopia, Sub-Saharan Africa	Qualitative (interviews)	Equitable relationships	Teaching and learning/ Engagement	Mixed and linear
126. Obamba, Kimbwarata & Riechi (2013)	Book/ chapter	Kenya, Sub-Saharan Africa	Qualitative (case study)	New knowledge that contributes to technological and social innovation	Innovation/ Engagement	Positive and linear
127. Okwu, Obiakor, Oluwalaiye & Obiwuru (2011)	Journal article	Nigeria, Sub-Saharan Africa	Quantitative (application of statistical method)	Graduate skill and knowledge	Teaching and learning	Mixed and complex
128. Oluga, Kiragu, Mohamed & Walli (2010)	Journal article	Multi-countries, Sub-Saharan Africa	Qualitative (interviews)	Strengthened basic education provision	Teaching and learning	Mixed and complex
129. Otaala, Maani & Bakaira (2013)	Journal article	Uganda, Sub-Saharan Africa	Qualitative (combination of more than one qualitative method)	Strengthened basic education provision	Teaching and learning	Mixed and complex
130. Pellicer, Assaad, Krafft & Salemi (2017)	Report	Multi-countries, Middle East and North Africa	Quantitative (application of statistical method)	Strong and engaged civil society	Teaching and learning	Positive and complex

Citation	Type of source	Country and region	Method	1st development outcome	Core function of TE	Pathway to change
131. Pitan & Adedeji (2012)	Journal article	Nigeria, Sub-Saharan Africa	Quantitative (survey report)	Economic growth	Teaching and learning	Misaligned and linear
132. Pompa (2014)	Report	Multi-LLMIC regions	Rigorous review	Enhanced professional knowledge and skill among all workers	Teaching and learning	Mixed and complex
133. Pongo, Effah, Osei-Owusu, Obinnim & Sam (2014)	Journal article	Ghana, Sub-Saharan Africa	Mixed method (quant survey and qualitative method)	Enhanced professional knowledge and skill among all workers	Teaching and learning	Positive and linear
134. Posthumus, Martin & Chancellor (2013)	Report	Multi-countries, Sub-Saharan Africa	Rigorous review	New knowledge that contributes to technological and social innovation	Innovation/ Engagement	Mixed and complex
135. Premand, Brodmann, Almeida, Grun & Barouni (2012)	Report	Tunisia, Middle East and North Africa	Mixed method (quant survey and qualitative method)	Graduate skill and knowledge	Teaching and learning/ Engagement	Mixed and complex
136. Premand, Brodmann, Almeida, Grun & Barouni (2016)	Journal article	Tunisia, Middle East and North Africa	Mixed method (quant survey and qualitative method)	Graduate skill and knowledge	Teaching and learning	Mixed and complex
137. Pryor, Akyeampong, Westbrook & Lussier (2012)	Journal article	Multi-countries, Sub-Saharan Africa	Mixed method (quant survey and qualitative method)	Strengthened basic education provision	Teaching and learning	Misaligned and complex
138. Qazi, Raza, Jawaid & Karim (2018)	Journal article	Pakistan, South Asia	Quantitative (application of statistical method)	Poverty reduction and development of sustainable livelihoods	Not clear	Positive and complex
139. Rahman, Nakata, Nagashima, Rahman, Sharma & Rahman (2019)	Report	Bangladesh, South Asia	Quantitative (survey report)	Economic growth	Teaching and learning/ Research/ Innovation	Misaligned and linear
140. Ramos, Estudillo, Sawada & Otsuka (2012)	Journal article	Philippines, East Asia and Pacific	Quantitative (combination of quantitative methods)	Poverty reduction and development of sustainable livelihoods	Teaching and learning	Positive and complex

Citation	Type of source	Country and region	Method	1st development outcome	Core function of TE	Pathway to change
141. Rodríguez-Solera & Silva-Laya (2017)	Journal article	Multi-countries, Latin America and Caribbean	Qualitative (case study)	Equitable relationships	Teaching and learning/ Engagement	Positive and complex
142. Rugar, Ayodo & Agak (2010)	Journal article	Kenya, Sub-Saharan Africa	Quantitative (survey report)	Economic growth	Teaching and learning	Positive and linear
143. Sam (2018)	Journal article	Cambodia, East Asia and Pacific	Quantitative (survey report)	Graduate skill and knowledge	Teaching and learning	Misaligned and linear
144. Sangar (2014)	Journal article	India, South Asia	Quantitative (application of statistical method)	Economic growth	Teaching and learning	Misaligned and linear
145. Schendel (2015)	Journal article	Rwanda, Sub-Saharan Africa	Quantitative (survey report)	Graduate skill and knowledge	Teaching and learning	Misaligned and linear
146. Schweisfurth, Davies, Symaco & Valiente (2018)	Journal article	Philippines, East Asia and Pacific	Qualitative (interviews)	Strong and engaged civil society	Teaching and learning/ Engagement	Mixed and complex
147. Seetanah & Teeroovengadum (2019)	Journal article	Multi-countries, Sub-Saharan Africa	Quantitative (application of statistical method)	Economic growth	Teaching and learning/ Innovation	Positive and linear
148. Sheldan & Qwaider (2018)	Journal article	West Bank and Gaza, Middle East and North Africa	Quantitative (survey report)	Equitable relationships	Teaching and learning	Mixed and linear
149. Sid Ahmed (2010)	Journal article	Sudan, Sub-Saharan Africa	Quantitative (survey report)	Equitable relationships	Teaching and learning	Positive and linear
150. Situmorang, Gultom, Hamid, Panjaitan & Ritonga (2018)	Journal article	Indonesia, East Asia and Pacific	Mixed method (quant survey and qualitative method)	Strengthened basic education provision	Teaching and learning/ Engagement	Positive and complex
151. Skjortnes & Zachariassen (2010)	Journal article	Madagascar, Sub-Saharan Africa	Qualitative (interviews)	Equitable relationships	Teaching and learning	Mixed and complex
152. Tamim (2013)	Journal article	Pakistan, South Asia	Qualitative (interviews	Equitable relationships	Teaching and learning	Misaligned and complex
153. Teal (2011)	Journal article	Multi-countries, Sub-Saharan Africa	Quantitative (application of statistical method)	Economic growth	Teaching and learning	Positive and linear
154. Thomas (2019)	Journal article	India, South Asia	Qualitative (historical policy analysis)	Equitable relationships	Teaching and learning	Misaligned and complex

Citation	Type of source	Country and region	Method	1st development outcome	Core function of TE	Pathway to change
155. Tierney, Sabharwal & Malish (2019)	Journal article	India, South Asia	Qualitative (combination of qualitative methods)	Equitable relationships	Teaching and learning	Mixed and complex
156. Tripney & Hombrados (2013)	Journal article	Multi-LLMIC regions	Rigorous review	Economic growth	Teaching and learning	Positive and complex
157. Truex (2011)	Journal article	Nepal, South Asia	Quantitative (survey report)	Equitable relationships	Teaching and learning	Positive and linear
158. Ukwueze & Nwosu (2014)	Journal article	Nigeria, Sub-Saharan Africa	Quantitative (application of statistical method)	Poverty reduction and development of sustainable livelihoods	Teaching and learning	Positive and linear
159. Upadhya (2016)	Journal article	India, South Asia	Qualitative (combination of methods)	Equitable relationships	Teaching and learning	Mixed and complex
160. Urzua (2017)	Book/ chapter	Multi-countries, Latin America and the Caribbean	Quantitative (application of statistical method)	Economic growth	Teaching and learning	Positive and linear
161. Uwaifo Oyelere (2011)	Journal article	Nigeria, Sub-Saharan Africa	Quantitative (application of statistical method)	Economic growth	Teaching and learning	Positive and complex
162. Uzair-ul-Hassan & Noreen (2013)	Journal article	Pakistan, South Asia	Quantitative (survey report)	Graduate skill and knowledge	Teaching and learning	Misaligned and linear
163. Valdez (2012)	Journal article	Philippines, East Asia and Pacific	Quantitative (survey report)	Graduate skill and knowledge	Teaching and learning	Positive and linear
164. Van, Mao & Cnudde (2018)	Journal article	Cambodia, East Asia and Pacific	Mixed methods (quant survey and qualitative method)	Strengthened basic education provision	Teaching and learning	Positive and linear
165. Visser & Gerharz (2016)	Journal article	Bangladesh, South Asia	Qualitative (interviews)	Equitable and sustainable relationships	Teaching and learning/ Engagement	Mixed and complex
166. Wamala, Chamberlain & Nabachwa (2012)	Journal article	Multi-countries, Sub-Saharan Africa	Quantitative (survey report)	Graduate skill and knowledge	Teaching and learning	Mixed and linear
167. Wright & Plasterer (2010)	Journal article	Kenya, Sub-Saharan Africa	Qualitative (interviews)	Graduate skill and knowledge	Teaching and learning	Positive and linear

Citation	Type of source	Country and region	Method	1st development outcome	Core function of TE	Pathway to change
168. Young & Kumar (2016)	Journal article	India, South Asia	Qualitative (interviews)	Poverty reduction and development of sustainable livelihoods	Teaching and learning/ Innovation	Mixed and complex
169. Young, Kumar & Jeffrey (2017)	Journal article	India, South Asia	Qualitative (interviews)	Enhanced professional knowledge and skill among all workers	Teaching and learning/ Innovation	Mixed and complex
170. Zavale & Macamo (2016)	Journal article	Mozambique, Sub-Saharan Africa	Mixed methods (quant survey and qualitative method)	New knowledge that contributes to technological and social innovation	Research/ Innovation	Misaligned and complex

Appendix 2: List of low- and lower-middle-income countries (World Bank, 2019)

List of countries (WB, June 2019)			
Afghanistan	AFG	South Asia	Low income
Angola	AGO	Sub-Saharan Africa	Lower middle income
Bangladesh	BGD	South Asia	Lower middle income
Benin	BEN	Sub-Saharan Africa	Low income
Bhutan	BTN	South Asia	Lower middle income
Bolivia	BOL	Latin America and Caribbean	Lower middle income
Burkina Faso	BFA	Sub-Saharan Africa	Low income
Burundi	BDI	Sub-Saharan Africa	Low income
Cabo Verde	CPV	Sub-Saharan Africa	Lower middle income
Cambodia	KHM	East Asia and Pacific	Lower middle income
Cameroon	CMR	Sub-Saharan Africa	Lower middle income
Central African Republic	CAF	Sub-Saharan Africa	Low income
Chad	TCD	Sub-Saharan Africa	Low income
Comoros	**COM**	Sub-Saharan Africa	**Lower middle income**
Congo, Dem. Rep.	COD	Sub-Saharan Africa	Low income
Congo, Rep.	COG	Sub-Saharan Africa	Lower middle income
Côte d'Ivoire	CIV	Sub-Saharan Africa	Lower middle income
Djibouti	DJI	Middle East and North Africa	Lower middle income
Egypt, Arab Rep.	EGY	Middle East and North Africa	Lower middle income
El Salvador	SLV	Latin America and Caribbean	Lower middle income
Eritrea	ERI	Sub-Saharan Africa	Low income
Eswatini	SWZ	Sub-Saharan Africa	Lower middle income
Ethiopia	ETH	Sub-Saharan Africa	Low income
Gambia, The	GMB	Sub-Saharan Africa	Low income
Ghana	GHA	Sub-Saharan Africa	Lower middle income
Guinea	GIN	Sub-Saharan Africa	Low income
Guinea-Bissau	GNB	Sub-Saharan Africa	Low income
Haiti	HTI	Latin America and Caribbean	Low income
Honduras	HND	Latin America and Caribbean	Lower middle income
India	IND	South Asia	Lower middle income
Indonesia	IDN	East Asia and Pacific	Lower middle income

List of countries (WB, June 2019)			
Kenya	KEN	Sub-Saharan Africa	Lower middle income
Kiribati	KIR	East Asia and Pacific	Lower middle income
Korea, Dem. People's Rep.	PRK	East Asia and Pacific	Low income
Kyrgyz Republic	KGZ	Europe and Central Asia	Lower middle income
Lao PDR	LAO	East Asia and Pacific	Lower middle income
Lesotho	LSO	Sub-Saharan Africa	Lower middle income
Liberia	LBR	Sub-Saharan Africa	Low income
Madagascar	MDG	Sub-Saharan Africa	Low income
Malawi	MWI	Sub-Saharan Africa	Low income
Mali	MLI	Sub-Saharan Africa	Low income
Mauritania	MRT	Sub-Saharan Africa	Lower middle income
Micronesia, Fed Sts	FSM	East Asia and Pacific	Lower middle income
Moldova	MDA	Europe and Central Asia	Lower middle income
Mongolia	MNG	East Asia and Pacific	Lower middle income
Morocco	MAR	Middle East and North Africa	Lower middle income
Mozambique	MOZ	Sub-Saharan Africa	Low income
Myanmar	MMR	East Asia and Pacific	Lower middle income
Nepal	NPL	South Asia	Low income
Nicaragua	NIC	Latin America and Caribbean	Lower middle income
Niger	NER	Sub-Saharan Africa	Low income
Nigeria	NGA	Sub-Saharan Africa	Lower middle income
Pakistan	PAK	South Asia	Lower middle income
Papua New Guinea	PNG	East Asia and Pacific	Lower middle income
Philippines	PHL	East Asia and Pacific	Lower middle income
Rwanda	RWA	Sub-Saharan Africa	Low income
São Tomé and Principe	STP	Sub-Saharan Africa	Lower middle income
Senegal	**SEN**	Sub-Saharan Africa	**Lower middle income**
Sierra Leone	SLE	Sub-Saharan Africa	Low income
Solomon Islands	SLB	East Asia and Pacific	Lower middle income
Somalia	SOM	Sub-Saharan Africa	Low income
South Sudan	SSD	Sub-Saharan Africa	Low income
Sudan	SDN	Sub-Saharan Africa	Lower middle income

List of countries (WB, June 2019)			
Syrian Arab Republic	SYR	Middle East and North Africa	Low income
Tajikistan	TJK	Europe and Central Asia	Low income
Tanzania	TZA	Sub-Saharan Africa	Low income
Timor-Leste	TLS	East Asia and Pacific	Lower middle income
Togo	TGO	Sub-Saharan Africa	Low income
Tunisia	TUN	Middle East and North Africa	Lower middle income
Uganda	UGA	Sub-Saharan Africa	Low income
Ukraine	UKR	Europe and Central Asia	Lower middle income
Uzbekistan	UZB	Europe and Central Asia	Lower middle income
Vanuatu	VUT	East Asia and Pacific	Lower middle income
Vietnam	VNM	East Asia and Pacific	Lower middle income
West Bank and Gaza	PSE	Middle East and North Africa	Lower middle income
Yemen, Rep.	YEM	Middle East and North Africa	Low income
Zambia	ZMB	Sub-Saharan Africa	Lower middle income
Zimbabwe	ZWE	Sub-Saharan Africa	Lower middle income

This appendix provides additional detailed information on the methodology used for this review and expands on the description in Chapter 3.

1. Guideline for searching databases

Category	Parameter/definition
Dates for inclusion	**2010–20**
Language	English
Sector	Tertiary education: Systems and institutions providing formal education beyond secondary school. This encompasses university education, post-secondary technical and vocational education and training provided through institutions offering formal qualifications, and professional training leading to a professional or vocational qualification such as that offered by business and medical schools, polytechnics and technical colleges, teacher-training colleges and two-year further education institutions.
Geographical context	Low- and lower-middle-income countries (as per WB list, 2019).
Conceptual relevance of study	Demonstrates some investigation of the role/contribution/impact of tertiary education on development (looking at economic and non-economic outcomes) in at least LLMICs. Studies focusing exclusively on inputs into TE (such as financing arrangements, institutional governance structures, faculty numbers and/or qualifications, or TE policies) or on experiences within TEIs are not included, unless they analyse the effect of such inputs or experiences on development outcomes. This follows Oketch et al., 2014.
Type of literature	Published sources and available through online platforms. Guideline drawing on Oketch et al., 2014. • Likely to include some element of peer review or adherence to professional standards of research (such as journal articles, books, conference papers or institutional grey literature, e.g. reports). • Unpublished sources such as theses/dissertations, meeting minutes, newspaper articles and research reports that have not been peer reviewed are not included.
Key areas of focus (development outcomes as outlined in the conceptual framework)	• Graduate skill and knowledge. • Enhanced professional knowledge, understanding and skill among all workers. • Economic growth. • Poverty reduction and development of sustainable livelihoods. • Equitable relationships. • New knowledge that contributes to technological and social innovation. • Strengthened and transformed institutions. • Strengthened basic education provision. • Strong and engaged civil society.

2. Databases explored

Education databases
ERIC (ProQuest or EBSCO)

Social science databases
Social Sciences Citation Index
International Bibliography of the Social Sciences

Main websites/online repositories
Department for International Development
World Bank (JOLIS for World Bank and International Monetary Fund literature)
UNESCODO
African Journals Online
Asia Journals Online
Latin America Journals Online
International Development Research Centre
Council for the Development of Social Science Research in Africa (CODESRIA)
African Education Research Database (see https://essa-africa.org/AERD)
International Association of Universities
Association of African Universities
Association of Commonwealth Universities
Higher Education Research and Advocacy Network in Africa (HERANA)
Centre for Higher Education Transformation (CHET)

A preliminary search of smaller websites of development co-operation partners working in LLMICs took place.

Phase 1				
Main term (OR)		**LLMIC (OR)**		**Development terms (OR)**
Tertiary education		Name of LLMIC country (as per list)		Development
				Social development
				Rural development
				Political development
				Knowledge economy
				New knowledge
Post-secondary education				Economic change
Higher education				Economic development
Vocational education				Economic impact
Technical and vocational education and training				Economy
University				GDP
College				Employment
				Unemployment
	AND		**AND**	Income
				Skills
				Labour
				Labour market
				Labour force
				Human capital
				Public good
				Social capital
				Innovation
				Social innovation
				Conflict
				Peace
				Social cohesion
				Civil society
				Technology
				Technological advancement

		Phase 2		
				Teacher education
				Teachers
				Professional education
				Health professionals
				Doctors
				Nurses

4. Guideline for application of evidence criteria

The following criteria were developed and applied to select studies that provided evidence to analyse more closely in relation to the research questions. [16]

- The topic covered in the work is substantially relevant to the concerns of the review and contributes to advancing wider knowledge or understanding about policy, practice or theory around the role of tertiary education delivered in LLMICs in development and underpinned/informed by some form of research process (empirical or non-empirical), which is made explicit.

- In addition, meets at least one of the following evidence criteria:

  – the research process involves empirical or non-empirical research where there is clarity around the research methods used and there is 'methodological fitness for purpose' (Clapton, Rutter & Sharif, 2010) – that is, the research design and methods used are clearly described, and the ways in which they are appropriate to addressing the research questions are clear (displays 'internal validity'). When no empirical research is reported, the theoretical or disciplinary framework used will have been clearly described and discussed

  – the context of the study (historical, locational, political, economic, social or cultural) has been clearly described

  – the work has been subject to a process of peer review or the application of some form of external scrutiny

  – the study demonstrates credibility to support the claims that are made by offering well-founded and plausible arguments about the significance/importance of the insights/findings generated (this is important for small-scale studies where findings and claims need to be understood and interpreted in context).

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15.   These are the main terms used in searches of databases. In addition, where other terms emerged in the process of conducting the searches these were also followed up.

16.   Clapton, Rutter & Sharif, 2010; Spencer, Ritchie, Lewis & Dillon, 2004; Nutley, Powell & Davies, 2013 and Gough, 2016.

5. Main codes used to map studies and evidence

Main code	Child code (1st level)	Child code (2nd level)	Child code (3rd level)	Notes
Contextual focus	Region	Country		As per WB, 2019
Conceptual focus	Nine development outcomes			
Type of reference	Journal article			
	Book/chapter			Book or one or more chapters of a book considered
	Report			
	Other			
Method	Quantitative	Survey report		
		Application of statistical methods		This involves secondary data analysis using regression analysis, correlation or principal component analysis
		Combination of more than one quantitative method		
		Randomised control trial		
	Qualitative	Interviews		
		Historical policy analysis		
		Case study		
		Combination of more than one qualitative method		
	Mixed	Quantitative survey and qualitative method		
		Application of statistical method and qualitative method		
	Rigorous review			

Main code	Child code (1st level)	Child code (2nd level)	Child code (3rd level)	Notes
1st Development outcome (1 of 9)	Pathway to change	Direction	Positive	Positive outcomes
			Misaligned	This may include evidence that shows that the change may lead to outcomes that are 'mismatched' with the intention and/or may be negative / harmful
			Both/mixed	Shows features of both positive and misaligned or positive and negative
		Modality	Linear	Relationship involves a simple set of linear drivers or a simple relationship of one aspect of TE and one aspect of a development outcome
			Complex	Relationship involves more complex processes of change involving multiple actors, relationships, processes and practices
	Core function of TE	Teaching and learning		
		Research		
		Innovation		
		Engagement		
		Not clear		
	Pathway to change	Direction	Positive	As above
			Misaligned	
			Both/mixed	
		Modality	Linear	
			Complex	
	Core function of TE	Teaching and learning		
		Research		
		Innovation		
		Engagement		
		Not clear		

6. Matrix to guide analysis of evidence

Research objectives and design	Pathway to change	Nature of the change	Key contextual factors influencing/shaping the pathway to change
• Aims and objectives • Methods • Any important conceptual framing	• Which of the core functions of TE drives/ informs the pathway?	• What development outcome does the pathway impact on/effect/ influence/shape?	• Any important contextual factors/conditions discussed that influence/ shape the pathway of change?

	• What is the direction of the pathway?
	  - Positive
	  - Misaligned
	  - Both/mixed
		• What is the change that the pathway leads to/ contributes to/impacts on?	

	• What is the modality of the pathway?
	  - Linear
	  - Complex		