



Mitigating impacts of the COVID-19 pandemic on higher education

A RAPID EVIDENCE REVIEW



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September 2021

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Funding & funder involvement

The UK government Department for Education (DfE) funded this work following a recommendation from the Scientific Advisory Group for Emergencies (SAGE).

This is one of four reviews successfully bid for and managed by the EPPI Centre (<https://eppi.ioe.ac.uk>) within the DfE/SAGE programme.

The work was undertaken under the umbrella of the ESRC funded International Public Policy Observatory (IPPO) (<https://covidandsociety.com>).

Conflicts of interest

There were no conflicts of interest in the writing of this report.

Contributions

The opinions expressed in this publication are not necessarily those of the EPPI Centre or the funders. Responsibility for the views expressed remains solely with the authors.

This report should be cited as: Unterhalter E, Howell C, Vigurs C, France R, Candy B (2021) *Mitigating impacts of the COVID-19 pandemic on higher education: a rapid evidence review*. London: EPPI Centre, UCL Social Research Institute, University College London.

Design and editorial support by: Lionel Openshaw

ISBN: 978-1-911605-24-9

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ABSTRACT

This rapid review assesses the published research evidence on what we currently know about the nature of the harms associated with the COVID-19 pandemic on higher education institutions in the UK. It focuses on teaching, learning and research in universities and their connections with the communities they serve. Thirty-eight studies of harms associated with higher education are included in the review, documenting a deepening of inequalities associated with access and participation, harms associated with mental health and wellbeing, alterations in learning and teaching, disrupted research agendas, difficulties in planning and management, and anxieties about future work prospects. There are indications of concern at increased levels of gender-based violence, although no substantial data on this theme. 39 systematic reviews of interventions to address or mitigate these harms were reviewed together with 13 empirical studies of responses to disasters and pandemics, notably floods, earthquakes, HIV and SARS. Highly effective mitigating interventions were noted regarding grants to students to complete studies, expanded provision for and access to mental health and wellbeing services, improved learning, and teaching strategies to take account of vulnerabilities to disaster, and clear management planning to prepare for disaster and risk. Conclusions note the evidence on the harms created by the pandemic is preliminary and partial as the review has been conducted at a time when many of the effects of the pandemic on higher education are still emerging, with limited opportunities for rigorous documentation of changes over time. Nonetheless the harms summarised in the report point to pressures on widening participation strategies, student financial hardship, stress and anxiety for students and staff, uneven or truncated learning experiences, and difficulties for management in planning in the short- and medium-term. The approaches to mitigation and adaptation we have found highlight the importance of not simply seeing the pandemic as a single bitter moment affecting only certain groups in certain sectors of the education system in particular ways. Rather, they highlight the interconnectedness between the higher education sector and other parts of the education system. This shows how the system as a whole needs to improve the ways in which it plans and supports access to higher education including student financing, how it provides wellbeing and mental health services, and how it approaches enhanced learning, teaching, research and management. All this while acknowledging both shared and sector-specific vulnerabilities as well as the centrality of education in supporting wider society through difficult times.

EXECUTIVE SUMMARY

Authors and report reference

Elaine Unterhalter, Colleen Howell, Carol Vigurs, Rachel France, Bridget Candy (2021): Mitigating the impacts on students and staff of the disruptions to higher education institutions during the COVID-19 pandemic: a rapid evidence review.

Author roles

The main conceptualisation of the problem and approach was undertaken by Elaine Unterhalter, Colleen Howell, and Rachel France, with support in searches and selection of studies for inclusion from Carol Vigurs and Bridget Candy. The detailed review of the literature, quality assessments, drafting and redrafting of the narrative accounts were undertaken by Elaine Unterhalter, and Colleen Howell. Carol Vigurs, Rachel France, and Bridget Candy worked on the quality assessments of the studies of mitigations. Rachel France and Bridget Candy contributed to refinement of the argument and editorial work.

The issue of concern

The COVID-19 health crisis has had short- and long-term harmful effects on all phases of education, their connection with each other, and with other areas of social, cultural, economic and political processes. This report aims to understand the research evidence on these harms in relation to higher education institutions and what we know about approaches to mitigation.

The higher education sector, like other phases of education, has been profoundly affected by the pandemic. Institutions have been closed, and in all universities, a large part of teaching and learning took place online for the academic years 2019/2020 and 2020/2021. Admission processes had to recalibrate because of the changed arrangements for school leaving examinations in 2020. Research was paused, halted or reformulated because labs could not operate, and data collection could not take place face-to-face. The impacts of the pandemic included stress from the disruption of daily routines, illness and death amongst staff, students, and their families. For some this was coupled with the loss of jobs, income, and places to live and work. This report documents what we know about research on harms associated with the functions of higher education and strategies to address these. We have reviewed work addressing harms and mitigations in these areas associated with higher education policy:

- Learning and teaching – at undergraduate and post-graduate level across all discipline areas;
- Research, Public engagement and innovation by universities;
- Campus and institutional management;
- Student support and development.

Rapid reviews are delivered at pace, and in response to immediate demands for overviews of findings from research, as a result decision are made on how to reduce the usual time taken on one of the stages and processes of a full systematic review. This may be in narrowing the focus of the review, by population or to the most comparable contexts, or by focusing only on those sources of literature where the most on-topic studies are likely to be found. Each of these approaches involve trade-

offs between specificity of topic against the generalizability of findings and what could also be learned from the wider issues and insights around the topic that may also be of interest. In this review, rapidity was achieved by searching only for UK evidence regarding harms. For mitigation strategies, we searched in the first instance for the most trustworthy and relevant systematic reviews but, as relatively limited relevant evidence was found, we also considered evidence from other disasters leading to the unscheduled disruptions of higher education institutions.

One limitation to this rapid review may be that it does not deal with all aspects of UK universities' remit with regard to teaching, learning, staff support, and institution building. The review however, does include all studies of students and staff that are relevant to the learning, teaching and research mission of universities and lie within the DfE policy remit and responsibilities.

How did we find this research?

We searched bibliographic databases for the search terms that were specific to our population and education type, and included terms for COVID-19 and limited these to UK studies for the question on the nature and extent of the harms. We searched additional sources for grey literature (reports and articles not published in journals).

We searched again for systematic reviews that aimed to mitigate the harms we identified in the first part of the review of the nature and extent of UK COVID-19-related harms. These were wider than the focus on the UK and COVID-19-related literature, where there was more than one systematic review, the best available evidence was selected by making a judgment about

1. The most up to date systematic review. To avoid double counting individual studies included in reviews as well as choosing the most up to date findings.
2. The systematic review most relevant/ transferrable in terms of population, contexts and topics.

What research evidence did we find?

Nature and extent of different harms (UK-specific literature)

We found 39 studies of harms linked with COVID-19 and the effects on UK universities. Studies were grouped in relation to:

- a) Harms to access – 5 studies mainly dealing with the disruptions to widening participation agendas;
- b) Harms to participation – 22 studies dealing with worsening mental health, reduction in wellbeing, limited access to support services, and the fragility of students' financial position. Gender-based violence was mentioned in two studies but, strikingly, was not the focus of any substantive study;
- c) Harms to quality – 13 studies dealing with disruptions and changing to education and training, changes in research processes, and stress in the relationship between higher education institutions and the communities they serve;
- d) Harms to outcomes – 16 studies dealing with fears of a reduction in skill for graduates, notably health workers and teachers, and reductions in research findings;

- e) Harms to connections – 4 studies dealing with stress to the public good role of universities.

Most studies used a survey design, documenting events and perceptions as they unfolded. Only a small number of studies compared data collected during the pandemic with the situation before COVID-19.

Immediate responses / mitigation to these (Not UK-specific evidence)

We found 39 systematic reviews and 13 empirical studies of mitigations to the harms we had identified. Not all dealt with the UK. We also drew on a wide range of experiences of the higher education sector with other pandemics (HIV and SARS), with environmental disasters (floods, earthquakes, tsunami), economic crises (2008 financial crash) and experiences of conflict and protracted emergency. We identified the following evidence of mitigation strategies associated with specific harms identified:

Harms	Mitigations
Access	
Exclusion of students from historically disadvantaged groups and disruption of widening participation initiatives	Tailor programmes for secondary school pupils from historically disadvantaged groups to support successful enrolment in higher education
Changes to school leaving examinations & university enrolment	Trial and consider risks and opportunities for historically disadvantaged groups associated with teacher based final assessments and the link between assessment and learning
Participation	
Student poverty and reduced finance	Generous financial support with fees and living expenses
Reductions in mental health and wellbeing	More extensive provision of wide range of mental health and wellbeing services, with easier access to services
Gender-based violence	Developing appropriate policy, provision for safe spaces and financial support, and developing courses of sufficient length and depth
Quality	

Changes in curriculum and pedagogy through online delivery	Adapting online or blended learning in ways appropriate to specific programmes and students
Stress and distress amongst staff and research students	Teaching and researching about disasters and pandemics as part of mainstream higher education curriculum and research programmes
Lack of management preparation for pandemic	Improving higher education disaster management planning
Outcomes	
Reduced job opportunities for graduates due to disrupted education	Supporting graduates into work through partnerships between HEIs, employers and policy makers
Connections	
Diminished motivation of historically excluded groups with entering university	Increased civic university engagements
Concern with increased inequalities and reduced support for ideas about connection between higher education and public good	Build partnerships in knowledge development, teaching and organization building

Longer term changes (Not UK-specific evidence)

In terms of longer-term changes, opportunities and threats the literature reviewed identified longer term institutional transformations and shorter term ‘quick fixes’. Threats associated with longer term processes of change are that they take many different directions and initial goals are not always fully realised. Threats associated with short-term interventions are that they may ‘fix’ only one part of the problem. Three immediate areas of change were noted regarding student financing, building institutions’ capacity for disaster risk reduction planning, and improving overall delivery of learning and teaching. Medium- and long-term change was noted in relation to addressing gender-based violence, and building open relationships with the communities served by higher education.

Conclusions

Since this study has been conducted at a time when many of the effects of the pandemic on higher education are still emerging, the available evidence on harms is preliminary and partial as there has been limited opportunity for rigorous documentation of changes over time. Nonetheless the harms we found point to

pressures on widening participation strategies, student financial hardship, stress and anxiety for students and staff, uneven or truncated learning experiences, and difficulties for management in planning in the short and medium term.

The approaches to mitigation and adaptation we have found highlighted the importance of not simply seeing the pandemic as a single bitter moment affecting only certain groups in certain sectors of the education system in particular ways. Rather, they highlight the interconnectedness between the higher education sector and other parts of the education system. This shows how the system as a whole needs to improve the ways in which it plans and supports access to higher education including student financing, how it provides wellbeing and mental health services, and how it approaches enhanced learning, teaching, research and management. All this while acknowledging both shared and sector-specific vulnerabilities as well as the centrality of education in supporting wider society through difficult times.

BACKGROUND

Higher education in the UK, like other phases of education, has been profoundly affected by the COVID-19 pandemic. Institutions have been closed, and for the majority of universities, teaching and learning took place online for a major part of the academic years 2019/2020 and 2020/2021. Admission processes had to recalibrate because of the changed arrangements for school leaving examinations in 2020. Research was paused, halted or reformulated because labs could not operate, and data collection could not take place face-to-face; libraries and archives were closed for long periods. The impacts of the pandemic included stress from the disruption of daily routines, illness and death amongst staff, students, and their families. For some this was coupled with the loss of jobs, income, and places to live and work. Everyone experienced changed, curtailed or non-existent contacts with close family members, friends, and colleagues. All these processes have had effects on those who study and work in higher education. Many have commented on how the inequalities between people, institutions, locales and communities have been revealed by the pandemic (British Academy/Abrams, 2021; Major, Eyles, Machin, 2020) and, the higher education sector, itself highly segmented and associated with inequalities of race, gender and class (Bhopal and Henderson, 2021; Bhopal, 2017; Waller, Ingram and Ward, 2017), needs scrutiny. There have been profound effects on the income of higher education institutions, and on their capacity to deliver on their mission statements regarding engaging with local, national and international communities. Widening participation strategies have been thrown into disarray. The ways in which higher education institutions have been able to offer appropriate student support and development and connect well with other phases of the education system have become areas requiring scrutiny and review.

This report has been researched and written at a particular phase of the pandemic, when it is still too early to assess what the separate effects for education have been of the pandemic, the lockdown, and the attendant social, economic and political challenges. Therefore, it is not possible separate out harms due specifically to closure of universities and harms due to other factors connected with the pandemic. What has appeared consistently in the commentary on the pandemic has been a theme of the interconnectedness of the education sector with all other areas of public policy and social relationships. While conventions of administration, disciplinary focus, and social relations demarcate boundaries between different phases of education and different areas of experience, for example, health, work, and education, the pandemic has highlighted their interconnection. Appreciating how these connections have been documented in the research literature is an important step in building and learning from the tragedies, stresses, and loss of the past eighteen months.

Rationale for the review

This review assesses the published research evidence on what we currently know about the nature of the harms associated with the COVID-19 pandemic drawing out processes of disruption in higher education in the UK. It specifically considers the implications of these developments for other phases of education. The review considers the evidence on approaches to mitigating harms in the higher education sector in the short-term. It also considers the literature on medium- and longer-term experiences of mitigation and some of the new opportunities for higher education in the UK and other countries, given what is known about responses to pandemics, environmental disasters and prolonged conflict.

The review focuses on higher education institutions, their main functions, and their connections with other phases of education. The functions of higher education can be defined as learning and teaching, research, public engagement, innovation, campus and institutional management, and student support and development. Higher education institutions' connection with other phases of education of particular concern to the Department of Education (DfE) relate to the training of teachers and other professionals who work in schools, early years education, further education and the learning pathways offered to students who complete secondary school. In addition, higher education institutions provide education research, innovation, and community engagement to local education initiatives through forms of civic engagement, and provide specific education-linked services to wider national and international processes associated with developing education policy and practice.

Positionality

The review builds on the experience of the authors in conducting a rigorous review of literature on the development outcomes associated with tertiary education in low and lower middle-income countries (Howell, Unterhalter and Oketch, 2020), where disasters linked to health emergencies (e.g., Ebola and HIV), floods, earthquakes and conflict have been documented. It also connects with work of Unterhalter co-editing a special issue for the international NORRAG network on the effects of COVID-19 on education (Brehm, Unterhalter and Oketch, forthcoming 2021), and a number of journal articles, blogs and conference presentations the authors have written where the effects of the pandemic on opportunities, capabilities and inequalities, particularly gender inequalities have been discussed and mapped (Anand et al, 2020; Unterhalter, Longlands and Peppin Vaughan, 2020; Unterhalter, 2020; Unterhalter, 2021; Unterhalter and Howell, 2021).

OBJECTIVES

Review questions

What is the research evidence on: (i) the harms created by the COVID-19 pandemic in the higher education sector; (ii) effective mitigations for these harms; (iii) new opportunities and threats which may emerge to further enhance or limit the provision of higher education.

METHODS

Overall approach taken

Reviews vary in the breadth of their question, the depth with which they examine this question and the exhaustiveness of the review process. This review was undertaken in a very short period of time and this approach is sometimes called a ‘rapid review’. Rapid reviews are delivered at pace, and in response to immediate demands for overviews of evidence from research, as a result decisions are made on how to reduce the usual time taken on one of the stages and processes of a full systematic review. This may be in narrowing the focus of the review, by population or to the most comparable contexts, or by focusing only on those sources of literature where the most on-topic studies are likely to be found. Each of these approaches involve trade-offs between specificity of topic against the generalisability of findings and what could also be learned from the wider issues and insights around the topic that may also be of interest. In this review, rapidity was achieved by searching only for UK evidence regarding harms. For mitigation strategies, we searched in the first instance for the most trustworthy and relevant systematic reviews.

The review had two main sub-questions resulting in two stages with different research strategies:

- 1) **Stage 1:** We identified the nature and extent of harms or impacts of the pandemic on higher education in the UK. This was based on UK and COVID-19 specific primary or review research evidence published since November 2019.
- 2) **Stage 2:** We identified research evidence on responding to the harms identified in Stage 1 in terms of both immediate mitigation of those harms and longer-term adaptation to prevent future harms. This was based on the most up-to-date, relevant and trustworthy systematic reviews of the research evidence internationally.

The lead authors of this review are specialists in their field. This has enabled quicker clarification of conceptual issues and informed searching, appraisal, and interpretation of evidence. This strategy combines the rigour and transparency of systematic review principles with the insights of topic specialists. Some limitations of our rapid review with regards to evidence of mitigations are considered in our discussion.

Expanded research questions

The research questions for this review are:

- I. (RQ1) What is the nature and extent of different harms in the higher education sector and in the connections of higher education with other phases of education (UK COVID-19-specific literature)?
- II. (RQ2) What do we know about short-term immediate responses or longer-term structural approaches to mitigating these harms?
- III. (RQ3) What may be the longer-term changes (opportunities and threats) in the higher education sector and the connection of higher education with other phases of education?

Developing a conceptual frame

We developed a conceptual frame centering on different functions of higher education and the connection of higher education institutions with other phases of education. See Appendix 1.

We understand the functions of higher education to comprise the following and the overarching research question will investigate literature in these areas:

- **Learning and teaching** – at undergraduate and post-graduate level across all discipline areas.
- **Research** - creative and systematic work undertaken to increase the stock of knowledge; includes basic and applied research, and experimental development.
- **Public engagement** – takes the form of training professionals to work in specific public sectors (e.g. health and education), participating in discussions of policy and practice, providing resources (e.g. buildings, money, ideas) for a wide range of activities for public benefit.
- **Innovation** – contributing to specific projects, applications, long-term system building.
- **Campus and institutional management** – management of buildings, catering, security.
- **Student support and development** – providing pastoral support regarding health, including mental health, wellbeing, and development of resources that support the adaptation of curriculum and pedagogy to meet the needs of all students, including groups that have historically been marginalised.

We understand the connections of higher education with other features of education to centre on the following, which will be considered as part of both research questions:

- **Early years education** - Training of teachers, planners, administrators, managers, materials developers and support workers and research in and for this phase.
- **Primary and lower secondary education** - Training of teachers, planners, curriculum developers, administrators, managers/leaders, inspectors, materials developers, evaluators and support workers and research in and for this phase.
- **Further Education** – training of college lecturers, planners, curriculum developers, administrators, managers/leaders, inspectors, materials developers, evaluators and support workers and research in and for this phase
- **Interface with school leaving examinations** – relationships with examination boards, widening participation strategies developed by schools and NGOs and others.

Our focus for RQ 1 is on the nature and extent of harms in populations in the UK. In RQ 2 and 3 we looked more broadly drawing initially on already completed systematic reviews of international literature and expanding these as required. We have reviewed global evidence since 1995, selected because this is acknowledged as a date when the effects of the HIV pandemic began to be evident in education, leading to a range of initiatives in the higher education sector (Aggleton, Yankah and Crewe, 2011; Kelly, 2003, Wiseman and Glover, 2012). We also looked for evidence reviews of the effects on higher education of three health pandemics - HIV, SARS and Ebola – and

environmental disasters (floods, earthquakes, tsunami) and of protracted crises and conflict including sudden economic shocks. In reviewing these studies, we have aimed to look at what they indicate about processes in higher education responding to disaster and what the evidence suggests need to be learned about the outcomes of these initiatives.

The conceptual diagram in Appendix 1 gives an indication of how the harms set out in the terms of reference will be grouped in relation to different functions of higher education and how some of the processes of mitigation will be classified.

Defining harms

The DfE provided the following list of harms to consider both in the short- and longer-term:

- Mental Health
- Well-Being & Development
- Physical Health
- Nutrition
- Misuse of Substances
- Domestic Violence
- Support Service Access
- Indirect Groups at Risk (e.g., those with extended caring responsibilities)
- Vulnerable children and SEND children
- Learning loss / Educational Knock-on Effect
- Immediate Earning Capacity Changes

In preliminary reviewing of the literature on higher education we identified further sector specific harms:

- Reduction in skill by key workers in health and education
- Limits on students' access to finance
- Reductions in finances available to higher education institutions

and longer-term harms:

- Gender & Social Group Imbalance Widening
- Changes in socioeconomic status (SES)
- Reduction in knowledge production
- Connections between higher education and other education phases
- Connections between the higher education sector and wider society

We organised the harms to different aspects of the provision of higher education, as set out in Table 1 below.

Table 1 Organisation of harms on higher education

Category of harm (HE)	Specific harm (DfE list plus additional)
ACCESS	<ul style="list-style-type: none"> • Groups (particularly those historically excluded from higher education) at risk from non-admission or from changes associated with admission
PARTICIPATION	• Mental Health
	• Well-Being & Development
	• Misuse of Substances
	• Support Service Access
	• Physical Health
	• Nutrition
	• Domestic Violence
	• Gender and other social groups subject to discrimination
QUALITY	• Student finances
	• Training of key workers, especially teachers, health professionals
	• Graduate skills
OUTCOMES	• Loss of funding
	• Learning loss / Educational Knock-on Effect
	• Immediate Earning Capacity Changes [for children? Those entering the work force?] for students?
	• Widening of gender & other social group imbalances (long term harm)
	• Changes in socioeconomic status (SES) (long term harm)
CONNECTIONS	• Knowledge production/research capacity
	• Ongoing professional development of key workers, especially teachers
OTHER	• Other connections (public good)
	• Other harms

Full description of the methods used are in Appendix 2.

FINDINGS ON HARMS

Overview of the evidence on harms to higher education

Thirty-eight studies met inclusion criteria. A table showing studies by harm together with an assessment of study quality is in Appendix 5 with references in Appendix 6.

The majority of studies were surveys (n=28) (see Table 2), with around half being hard to assess for quality, for instance because they did not document how the sample was selected, lacked clarity in the questions asked, or provided little description of the approach to analysing the data. The conclusions that can be drawn from these studies therefore need consideration. Only a very few (n=5) compared data collected before the pandemic with that collected during the crisis. The bulk of the available data is therefore cross-sectional data from research processes with some limitations or weaknesses, so should be regarded cautiously.

Studies which provide insight into the issue regarding the form of the harm, even though there are some limitations regarding the methods, have been included and findings used, considering these together with other studies where the methods are more fully described. We have tried to disentangle, where possible, what is a short-term harm associated with the period of the pandemic, and what is part of a wider process.

The preponderance of surveys in this body of work is an indication of the way this research method can yield quick results using easily available technologies for gathering data. The very small number of qualitative studies (n=4) show partly how difficult it was to develop or sustain the face-to-face encounters needed for this type of study during lockdown, difficulties with securing ethical clearance for in-person work, and possibly some complications in analysing data under constantly changing conditions. As discussed below, there is also a notable presence of studies in the health sector, in some ways reflecting a quicker ‘pipeline’ to publication in health journals, as opposed to, for example social science or social policy.

Table 2 Included studies by research design and strenght of evidence

Type of study	Count	Strong (have confidence in evidence and integrity of study)	Some limitations/concerns with the evidence
Systematic reviews	2	2	0
Surveys	28	12	16
Case studies	1	0	1
Controlled studies	0	0	0
Qualitative studies	4	1	3

Secondary data analysis	3	2	1
TOTAL	38	17	21

Appendix 5 provides an overview of each study by category of harm together with our assessment of the strength of the research evidence.

Below we discuss the UK evidence on harms in detail.

Findings on harms to access to higher education

The studies of harms associated with access to higher education discussed aspects of groups at risk from widening inequalities. They focus on the teaching and learning function of higher education, issues of campus and institutional management, and the provision of student support and development.

Five studies identified harms associated with disruptions, distortions, or derailments of plans of school leavers from disadvantaged backgrounds (BAME and lower SES) who were planning to attend university (Atherton and Mazhari 2020; Gibson Smith and Clenand 2020; Scott 2020; The Sutton Trust, 2020; Wolf, Harrison and McManus 2021). Four studies outlined these harms as experienced by student applicants and one detailed how widening participation strategies of universities were not able to reach the groups most in need.

Studies that reviewed harms to students looked at objective indicators such as grades, and subjective processes, polling students' views through surveys. Lee, Stringer and Zanini, 2020, carried out a review for Ofqual comparing 2020 outcomes, using centre-assessed grades, calculated grades, and final grades, with results from 2018 and 2019. For each set of grades at A level and GCSE, results statistics were broken down by candidates' gender, ethnicity, first language, special educational needs status, free school meals eligibility, and socio-economic status. They concluded there was no difference in either the calculated grades or the final grades awarded in 2019/20 (for GCSE and A-Level) compared to previous years, and that claims they were systematically biased against candidates with protected characteristics or from disadvantaged backgrounds could not be substantiated. This study, because it dealt with school leaving examinations, rather than higher education access was not included in the list of studies on harms for this review.

Among the studies that linked school leaving examinations and higher education access, aspects of class, race and locale are most commented on. Atherton and Mazhari (2020) discussed how the lower grades obtained by students from BAME and lower SES backgrounds in London in examinations in 2020 (compared to the same cohort four years earlier) would limit widening participation initiatives and discourage some students from applying to university. They looked at UCAS data on the entry qualification profiles of student applicants (aged 18-24 years) from London in 2015-16 and 2019-2020. The study, conducted in October 2020, noted BAME and lower SES school leavers comprised the highest proportion of students entering higher education in 2020 with at least one E grade. Looking comparatively at data from 2015-2016, they projected 5,444 fewer students from London would enter HE in

2021-22 than would have been the case without the impact of COVID-19. Of these nearly 60% come from quintiles 1 & 2 (Atherton and Mazhari, 2020, 12).

Five studies report constraints on students' access associated both with harms linked with lower performance in school leaving examinations and with students' anxieties about how the changes and disruptions to A level examinations would affect their prospects of gaining admission (Atherton and Mazhari, 2020; Wolf, Harrison and McManus, 2021; Gibson Smith and Clenand, 2020; The Sutton Trust, 2020; Scott, 2020). Wolf, Harrison and McManus (2021) analysed the views and attitudes of 2,887 medical school applicants responding to an online questionnaire. The respondents had registered interest in applying to do medicine in 2019 and responded to the survey in 2020. A high proportion, most notably from BAME background, lower socio-economic groups, and state schools (as opposed to private schools), expressed anxiety that teacher grading would not be fair and hamper their chances of a place. Many from historically disadvantaged communities noted the lack of access to online support for schooling during their final year because of COVID-19.

These survey results confirm Gibson, Smith and Clenand's (2020) study which reviewed the social conditions associated with schools and homes which would contribute to the range of views documented in the survey. They constructed two cases of medical school applicants, one privately educated, living in an urban area, with professional parents, and one attending a state school with parents in the second most deprived income quintile, living in a remote area with limited digital access. They show how these conditions would adversely affect applicants' success in getting family support with their studies, online access to information, and backup from teachers and medical schools. They explored how these conditions would affect success in attaining the required grades for entry to medical schools. While the conclusions rest on developing 'cases' based on a synthesis of existing studies of the conditions affecting students from two contrasting backgrounds, because these are not cases based on primary research or the detail of conditions during COVID, the basis of the claims was judged indicative, rather than fully established.

A survey of medical students (Wolf, Harrison and McManus, 2021) and another of a wide range of applicants for undergraduate courses (The Sutton Trust, 2020) drawn from a poll of applicants applying to university through UCAS in April 2020 confirmed these findings. The poll was weighted to be representative of gender and school type although no further detail is given on demographics or how questions were asked. This study also highlighted students' anxieties that they would not receive the grades for their first-choice university (a feature of the results pattern identified by Atherton and Mazhari (2020) and the ways in which support from schools with university applications were disrupted by the pandemic). The study noted that students from working-class backgrounds were more likely to report considering changing plans to attend university, although no further detail on this was provided (Sutton Trust, 2020, 4).

Only one study dealing with harms associated with access reported on how universities' initiatives to widen participation had been thrown into disarray (Scott, 2020). This report, prepared in Scott's role as the Commissioner for Fair Access to the Scottish Government, drew on letters received from university leaders (Principals and their colleagues). It noted how outreach activities had been disrupted, and that the special programmes needed for historically excluded groups had not taken place or had become particularly difficult to conduct because of issues of mobility, digital

divides, and family disruptions (Scott, 2020, 7-8). The report draws out how students' social context would limit those from historically disadvantaged groups from entering university, and that this would be particularly apparent in courses with 'high stakes' entry requirements and no flexibility on the grades required for admissions.

The literature reviewed highlights how some of the education dimensions of harms associated with the COVID-19 pandemic were particularly pronounced at the boundary between school and university, and most harshly experienced by those already disadvantaged by socio-economic inequalities. Perceptions about the fairness of changes to the school leaving examination had consequences for the confidence of those who had historically not accessed university, and higher education institutions' capacity to engage with and allay these anxieties were thrown off course by the pandemic.

Findings on harms to participation in higher education

The majority of studies about harms to participation in higher education reported on aspects of mental and physical wellbeing (N=22) which restricted students' and staff engagement with learning, teaching and research. Studies noted students' worry and anxiety for themselves, friends, and families, and their concern that institutions would not be able to provide adequate material resources (such as safe accommodation), pedagogical resources (to support learning, teaching and assessment) and social resources (to support good peer networks or relationships with staff). A number of studies note increased level of anxieties amongst groups who were already vulnerable to discrimination. Thus, the functions of higher education most affected regarding participation were the quality of learning, the provision of student support and development, and campus and institutional management.

Mental health

Sixteen studies dealt with how stress, anxiety, and confusion regarding changes in the delivery of courses of study, the closure of university buildings and the general experience of the pandemic affected participation in higher education (Blackbullion 2021; Bu 2020; Carson 2020; Evans 2021; HEPI, 2021; Hewitt, 2020; Hussain, 2020; NUS, 2020a; NUS, 2020b; ONS, 2020; OPN 2020; Payne, 2020; Sneyd 2020; Scott, 2020;; YoungMinds 2021; Watermeyer, 2021). The majority dealt with mental health effects on students (detailed in 10 studies) and disruptions to their wellbeing associated with interruptions and changes in the pattern of academic work (detailed in 11 studies). Only one study dealt with these processes for staff working in higher education drawing out some of the implications for pedagogic practice (Watermeyer et al, 2021).

Most of the studies dealing with the ways the pandemic adversely affected the mental health of students were surveys conducted with a wide sample of students across all programmes, although some of these are of poor quality (e.g., Blackbullion, 2021 and YoungMinds (2021)). The surveys of students' views, conducted at different moments during the pandemic, draw out how students' worry about risk of illness for themselves, friends or family, anxieties at lack of finance, or difficulties in completing studies affected mental health. Sometimes 'mental health' is used as a 'catchall' category, linked with a sense of hopelessness or reduced motivation to study (Blackbullion, 2021) or are counterposed with a sense of satisfaction with

studies (HEPI, 2021; Hussain, Singh, Shah, and Jain, 2020). One study of the mental health needs of young people (Young Minds, 2021) is included, although students are not the main focus of the study, as its overall findings of the lack of mental health support or difficulties in accessing these for young people under stress is echoed in the reports of university leaders (Scott, 2020) and in studies of student views of their level of access to mental health support services (Hewitt, 2020).

Some studies draw out features of the particular effects of mental health harms including a heightened sense of anxiety (ONS, 2020), negative impact on family and social life, reduced confidence in students' higher education institution's ability to offer support and protection, intensified anxiety about examinations and doubts about completing or returning to study (NUS, 2020a, 2020b; Wonkhe, 2021). The survey commissioned by NUS of 4,178 students in FE and HE conducted in July 2020 reported a low sense of self-esteem and achievement amongst significant proportions of the sample with this particularly evident amongst arts and social science students, and those with a disability, not married, not heterosexual, and trans (NUS, 2020b, 15). This survey considered features of the social relationships of participants and where they were living. The study drew out how anxiety for family and friends and lack of confidence in the tools or skills available to cope with anxiety and stress were higher in students at university and was a particular feature of the responses of some groups. Women university students were most likely to mention concerns for family. Students who identified as Trans, Bi, Queer, or disabled were most likely to report concerns for friends. Older women students and those with caring responsibilities were the largest group reporting concerns for their own health. International students and those identifying as Trans, not heterosexual, or disabled comprised the largest proportions reporting a lack of confidence in their own skills to manage their wellbeing (NUS, 2020b, 16). Living spaces and the relationships that flowed from these were a particular concern. A heightened sense of anxiety amongst young people, compared to older adults is reported by Carson, Prescott, Allen, and McHugh (2020) although no specifics are given in that study of students as a particular cohort of young people. The ONS (2020) Student COVID-19 Insights Survey (SCIS) conducted in October and November 2020 showed students reported lower levels of life satisfaction, a lack of a sense of worthwhileness and happiness, and higher levels of anxiety, compared with those from the general population whose views had been surveyed through the Opinions and Lifestyle survey (OPN 2020) at the same time.

Women students comprised the largest proportion of those reporting mental health consequences (Blackbullion, 2021, 16), although in this study they comprised the majority of respondents. Women students reported specific anxieties associated with gender, sexuality, caring responsibilities, and visa status in the NUS study (2020b).

Insight into the specific, as opposed to more general effects of the pandemic on students' mental health is provided by three studies which contrasted student mental health concerns before and after the pandemic. Bu, Steptoe and Fancourt (2020) compared sociodemographic predictors of loneliness before and during the pandemic using cross-cohort analyses of data from UK adults captured before the pandemic (UK Household Longitudinal Study, n = 31,064) and during the pandemic (UCL (University College London) COVID-19 Social Study, n = 60,341). While the risk factors for loneliness were nearly identical before and during the pandemic, being a student emerged as a higher risk factor during lockdown. An increase in symptoms of depression was reported in Evans, Alkan, Bhangoo, Tenenbaum and Ng-Knight's (2021) study of 254 undergraduates, initially surveyed in autumn 2019 before the

pandemic, and surveyed again during lockdown (April/May 2020) when increased incidence of anxiety and depression were reported. Worries focused on contracting COVID-19 and were highly correlated with disrupted sleep. ONS (2020) compared data from the Student Academic Experience Surveys (SEAS) between 2016 and 2020 with data from the general population aged 20-24 years. This analysis showed declining proportions of students reporting a sense of life satisfaction, life worthwhileness, and happiness over four years, with a sharpened drop in 2020. Increased proportions of students reported on anxiety in 2020. The report contextualises these data noting how students have become more open about reporting mental health issues, as the proportion of university students who report a mental health condition in HESA has more than doubled between 2014/ 2015 and 2018/ 2019 from 1.8% (33,045 students) to 4.3% (81,960 students) of UK-domiciled students (ONS, 2020). But, bearing these caveats in mind, the trend in the 2020 SEAS survey across four questions concerned with mental health issues is important, as it highlights how existing mental health conditions increased the likelihood of harm during the pandemic.

Three studies focused on the mental health of medical trainees: Hussain, Singh, Shah, and Jain (2020) looked at ophthalmic trainees, Payne, Rahman et al (2020) looked at surgical trainees, and Sneyd, Mathoulin et al (2020) at trainee anaesthetists. These surveys drew out how disruptions in training and redeployments effected students' mental health and confidence. Trainee anaesthetists reported the most detailed mental health issues concerned with work-related anxieties, specifically concerning the provision of personal protective equipment, risks to themselves and to colleagues, coming on top of concerns for family and friends and domestic disruption (Sneyd et al, 2020).

We found only one study based on university leaders' accounts of students' mental health concerns: the letters collated by Scott (2020) comment on the form of institutional response to students' mental health needs and constraints on participation. This study highlights how anxieties were heightened for students because of the accommodation conditions in halls of residence as well as financial worries (pp12-13). Referrals to mental health services, which had increased in the years before the pandemic, were reported by one institution to have decreased, possibly because of restrictions on mobility and dissatisfaction with telephone services (Scott, 2020, 13) although demand for counselling was reported anecdotally by many institutions as very high.

Only one study, Watermeyer, Crick, Knight, and Goodall (2021), reported on the mental health issues for academic staff and the implications for pedagogic relationships. This study of 1,148 academics working in universities, surveyed participants from all the major disciplines, located in different positions in the career hierarchy. The study focused on what the authors describe as 'afflictions' associated with changes in academics' pedagogical roles, drawing out some of the implications for mental health, personal wellbeing and the teaching offered. The study notes that those working in some disciplines (e.g., computer science) were more prepared than others to switch to online delivery. But across all disciplines, many staff noted an increased workload, and profound changes to their sense of identity as a teacher. An increase in the sense of precarity for staff on short term contracts was also documented. These features of the experience of working during the pandemic Watermeyer et al (2021, 17) point to ' a pre-existing crisis of mental health in universities' which ' may worsen and not just for students but academics too—

struggling to manage increased pastoral demands with the needs of home, and forfeiting their right to work-life balance.’ They note how forms of mitigation linked to collegiality may fray as ‘academics connection with colleagues may also deteriorate’ and this has implications for the quality of learning and teaching offered.

These studies documenting harms associated with a decline in mental health for students and staff need some contextualisation. Firstly, the reported increase in anxiety and distress associated with the pandemic needs to be placed in the context of trends over the last ten years for much more openness and some reduced stigma in talking about mental health issues (Bondevik, 2011, Barry, 2012, Egheghina, 2019). The increased reporting by students on aspects of mental health during the pandemic is noted in the ONS study (ONS, 2020) as part of a longer-term trend to more confidence in talking about these issues, and Watermeyer et al (2021) also draw out how a number of pre-pandemic studies of work in higher education noted stress and anxiety as themes academics were willing to be open about discussing. There are as yet no studies of increases or decreases in the uptake of mental health services or treatments during the pandemic by students or staff in universities. Secondly, concerns to articulate mental health issues, and the possibility that these may be listened to, even indirectly through the work of researchers conducting a survey, may be associated with a form of coping strategy, not only as a simple indication of harm without mitigation. However, these two caveats are offered as an aspect of interpreting this literature on mental health harms, not as a refutation of the harms reported.

Wellbeing

Seventeen studies dealt with harms noted as hindering participation, linked with more generalised constraints on wellbeing (Barrett 2021; Bu 2020; Blackbullion 2021, Caruna 2020; Choi 2021; Evans 2021; Farnell 2021; Hewitt 2021; Ho 2020; Lambrecht 2020; NUSa & b; ONS,2021; Sneyed 2020; Scott, 2020; Watermeyer 2021; Wonkhe, 2021). Some did not explicitly link these constraints with mental health issues, although often the lines were blurred between evidence on a general reduction in wellbeing and social development, and studies that singled out mental health risks because of these conditions. Sometimes terms related to mental health and wellbeing were used interchangeably. Eleven of the studies dealt with a reduction in wellbeing also discussed this in terms of mental health noting loneliness (Bu, Septoe and Fancourt, 2020), money worries (Blackbullion, 2021, Scott, 2020, Wonkhe, 2021), anxieties about professional training or work (Caruna et al, 2020, Watermeyer et al, 2021, Sneyed et al, 2020), depression (Evans et al, 2021), stresses in relationships with family and friends, sometimes linked with accommodation (NUSa & b 2020, Wonkhe, 2020), and a sense of unhappiness and worthlessness (ONS, 2021). In this section we focus in more detail on areas associated with harms linked with a reduction in wellbeing, where mental health was not singled out for explicit comment.

Some studies document aspects of social relations which are associated with a reduction in wellbeing, but not definitively established because of the lack of a precise definition of the term. Barrett and Cheung (2021) in a cross-sectional online survey of 293 UK students established high levels of compliance with requirements of frequent handwashing and social distancing but did not remark on students’ views on whether this did or did not reduce their sense of wellbeing. Evans et al (2021) compared data collected from surveys of 254 undergraduates, the majority of whom

were women, before and after a lockdown, noting increased reporting of symptoms of depression, but decreased use of alcohol after lockdown, and a shift to night-time working, but not a marked disruption of sleep patterns, except from those reporting symptoms of depression. Again here, the data suggest but do not establish a reduction in wellbeing.

A number of studies highlight specific fragilities around the wellbeing of medical students. Choi et al (2021) surveyed 440 final year medical students and found there was some reduction in confidence about future work because of a disruption in provision of assistantship placements. Ho et al's (2020) systematic scoping study of the literature of medical students' exposure to death and dying during the pandemic highlighted the issues this raised for their sense of personal and social relations.

Doctoral students were particularly vulnerable to reductions in wellbeing. Lambrecht and Smith (2020) report on a survey of 701 doctoral candidates conducted in April 2020. Respondents highlighted difficulties in accessing supervision, disrupted research plans, and deterioration in their capacity to work productively linked with having to work at home and loss of jobs, with 82.7% reporting an overall decline in wellbeing, much more marked amongst women students.

Students' confidence in higher education institutions' capacity to respond adequately to supporting their wellbeing was reviewed in three studies. In a survey of 1,075 full-time undergraduate students in November 2020, Hewitt (2021) found a significant proportion (61%) had very restricted opportunities to leave their accommodation. The study also found that, while a majority of students were satisfied with online provision and felt safe in their higher education institutions, a significant minority (23%) did not respond positively to online learning provision, indicating groups for whom wellbeing was at risk. This finding was supported by Farnell, Skledar Matijević and Šćukanec Schmidt's (2021) synthesis of published journal articles and analysis of responses to surveys of institutions and student unions across the European higher education area, which highlighted that, despite a generally successful switch to online teaching, some students believed their performance had been affected and they had negative learning experiences tinged with boredom and even anger. Pearson and Wonkhe's (2020) survey of 3,461 students conducted in collaboration with 13 student unions in July 2020, reported on the responses of undergraduates and postgraduates, found a wide range of views on whether the success of online learning. The most common negative experience was associated with managing wellbeing in the absence of face-to-face meetings with friends, peers, and staff. Regarding teaching the lack of hands-on learning experiences was noted as the greatest gap. A later study by Wonkhe (2021), based on a survey in October 2020 in collaboration with 30 student unions, reached 7273 respondents from 121 universities, and reported 26% of respondents were disappointed or very disappointed with their learning, with the largest proportions of reports on negative experiences amongst students in their final year and those with a disability (Wonkhe, 2021, 6). The issues most mentioned around a decline in wellbeing centred on limits on interactions with other students, academics, difficulties in accessing facilities, and the gap between expectations and realities. The largest proportion of students who reported feeling lonely were those living in university accommodation or private halls (Woknhe, 2021, 15). Students who reported themselves most likely to drop out were those with a disability, who identified as LGBTQ, or had attended a state school (Wonkhe, 2021 20). The study suggests there is a link between the risk of dropout, loneliness and isolation, a reduction in academic confidence, often linked to loneliness, and a sense of missing

out on the curriculum or co-curricular activities (Wonkhe, 2021, 26). The study also found that a significant proportion of students did not understand their rights and felt there was little point in complaining as little would be achieved. This student perception of a lack of sense of belonging to an institution talks past the views of university leaders assembled by Scott (2020) which notes concerns at reduced levels of student wellbeing (pp10-12) and actions to address these, particularly regarding digital access, but does not report on specific interactions with student groups on loneliness or academic confidence.

The studies which link the experience of the pandemic with harms resulting in declines in mental health and a reduction in a sense of students' sense of wellbeing all comment on facets of social relationships which support learning, teaching and research. They highlight how these core functions of higher education may have continued during the pandemic, but that this process was achieved at a cost. The harms for particular groups of students, such as medical students are noted. A number of studies describe how groups which already suffer discrimination or additional hurdles because of poverty or sexual identity, are also those which report particularly high levels of anxiety and a reduction in wellbeing, for which institutions were able to do little to offer support. When there were stressful relationships in university accommodation, students could find themselves trapped without options for exit.

Alcohol and drugs

Only one study Evans et al (2021) based on a relatively small sample of undergraduates (n=254) surveyed before the pandemic (October 2019) and again after lockdown was imposed (April/May 2020) provides data on the use of alcohol, noting a decline in consumption during lockdown, possibly linked with pubs and restaurants being closed.

Limited access to support services

Five studies report on how limited or reduced access to support services for learning or student wellbeing exacerbated stress around mental health and social relationships (Ahmad 2021; Hewitt, 2020; Lambrechts, 2020; Scott, 2020; Hewitt, 2020). The support services which were not able to respond appropriately or adequately were linked to specific cohorts of students, for example, doctoral students as surveyed in Lambrechts & Smith's (2020) study, or international students as reported by Ahmad (2021). Some of the reasons general student support could not respond sufficiently were linked with issues of restrictions on mobility and face-to-face meetings (Scott, 2020). But around a quarter of respondents to the HEPI survey also comment on the limited responsiveness of student support services and student unions to new student needs developing in the pandemic (Hewitt, 2020).

Gender and harms associated with participation

Only one study based on the report of university leaders (Scott, 2020) comments explicitly on concerns with students' experience of sexual harassment or gender-based violence. This is an important gap in the evidence base and is surprising given that a feature of some of the student surveys reporting on wellbeing, note, but do not comment much on, the high proportion of women respondents (Lambrechts & Smith, 2020; Blackburn, 2020, Evans et al, 2020). As highlighted above some of the

concerns with reduced wellbeing linked to the care responsibilities of older women students (NUS 2020b; Wonkhe, 2020) and the social stresses on LGBTQ students. These are important areas for further investigation.

Student finance

Four studies identify students' lack of finance or insecurities linked to income as a particular subset of harms associated with participation and wellbeing. This relates both to lack of living expenses because of the absence of the part-time work students relied on (Blackbullion, 2020, Lambrechts & Smith, 2020), difficulties with meeting fees and accommodation costs (Wonkhe, 2020; Lambrechts & Smith, 2020), the disappearance of scholarships and other family income that was being used to finance study (Blackbullion, 2020 and Farnell et al, 2021), and the costs of accessing technology essential for learning (Scott, 2020). The financial squeeze on students has consequences for participation and two studies comment on these impacting most severely on those without family resources to fall back on (Scott, 2020; Wonkhe, 2020).

Summary of harms to participation

The research reviewed on harms associated with participation in higher education highlight social and emotional harms and an undermining of mental health. These effects, with consequences for learning, teaching and research, have many connected features. Some are material and link with reduced student finance for some groups. or difficulties with uncomfortable or unsuitable accommodation. Some are social features, linked with the peer, family, pedagogical and institutional relationships, all under intense pressure because of the health and other anxieties of the pandemic. Some are professional pressures, and are features of the particular vulnerabilities of groups of students working in health or on research degrees. To some extent harms experienced in other parts of the education system, for example children out of school during the lockdowns, contributed to these specific harms regarding higher education participation for those who were parents working or studying at university. But some of the harms to participation were sector specific, linked to the particular vulnerabilities of students, with a characteristic set of economic and accommodation needs.

Findings on harms to the quality of higher education

The studies we identified of harms associated with the quality of higher education examined aspects of the changes in teaching and learning and the disruption to specific skill formation which required being in a particular place or working with particular people, things or processes. These studies highlight harms which affect the teaching and learning and research functions of higher education and functions of public engagement. For the focus of this review these connections, which underline how universities connect with other parts of the education system, are a key area of concern.

Disruptions to training of health workers

Thirteen studies document how the training of health workers was disrupted with implications for their future practice because of inadequate opportunities for learning through practice and fine-tuning of skills. The majority focus on surgical specialisms:

Bodansky et al (2020) on the training of orthopedic surgeons; Caruna et al (2020) on cardiothoracic surgeons; Folkard et al (2020) on urological surgeons; Hussain et al (2020) on ophthalmic surgeons; and Payne et al (2021) on surgeons in intensive care. Others focused on particular areas of medical intervention: Siau et al (2021) on gastrointestinal endoscopy training; Sneyd et al (2020) on training for anaesthetists; and Veerasuri et al (2021) on radiology training. Three studies look at the general training of medical students (Choi et al, 2020; Sasithan, 2020; Woolf et al, 2020) and one at anatomical education (Longhust, 2020). It is striking that training of health professionals in areas of health care which have been widely discussed in the press during the pandemic – mental health, geriatric care, and end-of-life care – is not documented in these initial research studies of harms associated with the training of key workers. Another contrast associated with the rapid documenting of disruption of training in certain medical specialisms, is the absence of a sizeable body of research of the impact of school closures on trainee teachers, and the training of those associated with other aspects of the education system – support, administration, management, and evaluation. Only two studies (Worth and Faulkner-Ellis, 2021; La Velle, Newman, Montgomery and Hyatt, 2020) dealt with reduction in teacher training opportunities.

Graduate skills

The implications of disrupted training for graduate skills are highlighted in seven studies, which range across a wider area of graduate skill formation than some of the key skills associated with health workers noted above. All document how reduced opportunities to engage in training has implications for graduate quality, be this in ecology (Bacon and Peachock, 2021), research methods (Lambrechts, & Smith, 2020) or engineering (Piyatamrong, Derrick & Nyamapfene, (2021)). The special gaps in knowledge for international students is sketched by Ahmad (2021) and issues around reduced opportunities for student mobility highlighted by Farnell, Skledar Matijević and Šćukanec Schmidt (2021). Turner et al (2020) consider the implications of missed lessons in school chemistry for the future learning of chemistry students in higher education. Four studies raise questions of shifts in relation to teacher education, although only two (Worth and Falukner-Ellis, 2021 and La Velle, Newman, Montgomery and Hyatt, 2020) conclude that these are associated with harms. The ways in which teacher educators adapted their courses, often expanding rather than limiting opportunities for learning, is noted by Kidd and Murray (2020), while the survey of new teachers in Scotland, drawing on their ITE in the early phase of the lockdown reported on a strong sense of self efficacy (Carver and Shanks, 2021).

Findings on harms to higher education outcomes

We identified sixteen studies as showing evidence of COVID-19-related harms to the outcomes of higher education. These examine aspects of the changes in teaching and learning, research and the functions of public engagement, and highlight how disrupted learning had implications for intensifying inequalities or limiting the skills of graduates.

Disrupted Learning /educational knock-on effects

Fifteen studies found disrupted learning through the pandemic and the associated educational knock-on effects for both undergraduate and post-graduate students. One

study noted the impact of the pandemic on changes to the immediate earning capacity of graduates entering the labour market (Wonkhe (2020/21).

A number of studies identified additional outcome harms. Woolf et al, (2021) focused on fears of a widening of existing inequalities in relation to health professionals because of the way in which students were selected by medical schools, with greater reliance on teacher grades and assumptions of lower attainment by BAME students. Three studies noted harms to research outputs of universities and their knowledge production role (Banerjee et al, 2020; Lambrechts et al, 2020 & Watermeyer et al, 2021). Eleven studies draw on survey data but some limitations to the strength of the evidence were noted in seven where the sample used was relatively small, or it was not always clear how respondents had been selected.

Of the fifteen studies that showed evidence of disrupted learning and its knock-on effects, a central concern was on the disruptions and changes that had taken place to study and training, mostly associated with a specialised area of study or specialist professional training, notably health professionals. Disruptions were noted to clinical training, fieldwork and laboratory work. Bacon et al (2021), using an online poll undertaken with ecology lecturers in 2020, studied the impact of the move to online learning on the teaching of ecology. Fieldwork classes had either been cancelled completely or provided online, but staff did not always have the necessary skills and knowledge to run online fieldwork classes confidently. Four studies explored concerns with the practical or clinical training and laboratory work involved in the training of health professionals. Caruana, Patel, Kendall & Rathinam (2020) surveyed the impact of the pandemic on the wellbeing, practice, and progression of trainees in cardiothoracic surgery. They reported significant changes or “deviations” from normal clinical practice, involving a reduction in “clinical encounters” and “a significantly restricted participation in surgical procedures”. Most respondents were concerned that these changes were, or were likely to have, a negative impact on their professional development. The outcomes of disrupted training for final-year medical students were reviewed by Choi et al (2020) who note the changes that took place around assistantships and objective structured clinical examinations (OSCEs) with consequences for students becoming qualified doctors. In their survey of radiology students in a regional radiology school in the UK, Veerasuri, Vekeria, Davies, Graham & Rodrigues (2020) reported that 70% of respondents had experienced changes in their subspeciality experience, with opportunities being substantially reduced or completely removed. Drawing from the experiences of anaesthesia trainees, Sneyd et al (2020) argue that the pandemic has had a “seismic” impact on the clinical training of these students. Pearson and Wonkhe (2021), surveying a broader range of students, showed that for almost half, “hands-on learning experiences such as a lab, a practical, or time in a studio” were the elements of their learning experience they missed most.

Two studies documented the impact of the pandemic on initial teacher education, noting impacts on opportunities for student teachers’ practical training through school placements. Worth & Faulkner-Ellis (2021), drawing from data collected through the National Foundation for Educational Research (NFER) 2020/21 autumn survey, confirmed that school placement capacity for student teachers has been reduced, impacting on opportunities for student teachers to gain critical practical experience in the classroom. La Velle et al (2020), drawing on interviews with programme leaders of four initial teacher education programmes, suggest that these disruptions to high quality school placements of student teachers have had

implications across the profession. Worth & Faulkner-Ellis (2021:7) argue that disruptions to teacher education “could risk the smooth delivery of ITT in the next few years”.

Two studies looked at the impact of the pandemic on research capacity at universities and thus research outcomes. Lambrechts & Smith (2020) reported on the restrictions on research students’ projects, associated with delays in data collection. Banajee’s (2020:8) modelling of clinical academic research capacity suggests significant impacts on scientific research, with the pandemic “crushing the science needed at system level” and requiring a “total rethinking of research delivery”. Reduced academic research capacity is noted as a harm in Watermeyer et al’s (2020) study of staff views on their work conditions. The work involved in moving to online teaching, the closure of university buildings, and restrictions on fieldwork all impacted significantly on the ability of academic staff to undertake research.

It is too early to assess the ways in which the pandemic has changed what is learned in universities, the ways in which this is learned, and the research processes in different disciplines. All the studies reviewed comment on harms that are assumed will follow because of the disruptions of 2020 and 2021. These investigations, all conducted *during* the pandemic, register risks and possible harms which teacher, learners and researchers think will be apparent in the future. But definitive outcomes of these processes are not known. There are concerns that inequalities will become more pronounced in some professions, such as medicine or teaching, but this is not established (Woolf et al, 2021; Levalle et al, 2021).

Findings on harms to connections in higher education

The conceptual framing for this review mapped the connectedness of higher education institutions to other parts of the education system. We noted the role of higher education in the ongoing professional development of key workers, especially teachers and health professionals, as well as a broader societal ‘public good’ role. The specific harms noted in the sections above, are a feature of harms to the connectedness of the education system.

The disruptions to the training of health professionals can have an impact on staffing levels in the health care system and on ongoing professional development. Farnell, et al (2021) in their review of a wide range of study designs comment on the stress caused to the “social dimension of higher education” and particularly on its focus on equity and diversity and responsiveness to society and local communities. Their systematic review highlights the disproportional ways in which disadvantaged, underrepresented and vulnerable students have been affected by the pandemic. They draw attention to how a reliance on digital technology creates patterns of inequality that have the potential to exclude groups of learners. The altered opportunities for underrepresented groups in higher education and the consequences for this is also a feature of the interviews collated by Wonkhe (2020). While many of the harms noted in the sub-sections indicate immediate disruptions to the higher education ‘space’, the longer-term impact of these more diffuse harms associated with connection to the wider education system, the society and values around equity and inclusion may have longer term implications for higher education and its public good role.

FINDINGS ON MITIGATION STRATEGIES

We reviewed 39 systematic reviews relating to mitigations of the harms discussed above (see Appendix 7). A number of studies described mitigations that had already been put in place in response to COVID-19 (eg regarding surgical training (Hope, 2021) and medical education (Moretti-Pires, 2021)) but we have not reviewed these in depth because they described, but did not evaluate or research, the form of mitigations or their outcomes. The table in Appendix 8 assesses the focus of the systematic reviews discussed with regard to mitigations, and evaluates their appropriateness with regard to making assessments of mitigations to counter the harms noted above. As Appendix 8 shows in looking at systematic reviews of mitigations across the range of harms, we included an uneven number of systematic reviews for each harm, prioritising those that were most recent. We have discussed these reviews, taking account of our assessments of their relevance for this review. To deepen the discussion, we have also considered a small number of research studies (n= 24) of higher education institutions' response to other disasters and pandemics, which resulted in disruptions to higher education drawing on work from the US, New Zealand, South Africa, Malaysia, Japan and Italy. (See Appendix 9 for full list).

Mitigations to harms to access to higher education

The pandemic has highlighted what was already evident in the education system pre-COVID-19: that there is a clear attainment gap in schools associated with levels of poverty (Cooper and Stewart, 2021), and that this, together with the high cost to medium- and low-income families of higher education (Callender and Mason, 2017; Richardson, Mitelmeier and Rienties, 2020), present a significant barrier to widening participation plans. We found ten relevant reviews from which three deal with mitigating harms associated with widening inequalities in access. None, however, addresses some of the structural issues, associated with intersecting inequalities and access to education, discussed further below (see Opportunities and Threats section below).

Tailored programmes for secondary school pupils to support successful enrolment in higher education

There is more than two decades' research on programmes to widen participation in higher education with studies conducted across a wide range of countries including UK, USA, Australia, South Africa. Reviews detailed in Appendix 8 (Younger, Gascoine, Menzies and Togerson (2019); Robinson and Salvestrini (2020), Webb, Wyness and Cotton, 2017; Herbaut and Given, 2019) all note that a mix of approaches generally comprising mentoring and support with university entrance applications is more effective than just providing students with general information. Financial incentives either on their own or combined with information, motivation and support are also highly effective (Younger et al, 2019; Herbaut and Given, 2020).

Not only have there been harms associated with disruption to existing widening participation programmes, but the pandemic has exacerbated the existing fault-lines that widening participation is intended to address. The reasons for the success of particular combinations of intervention are unclear. Heaslip, Hutchings et al (2020) in their systematic review of 26 published studies of widening participation strategies note that there is insufficient attention about why particular interventions do or do not work, which raises the wider question concerning the underlying

conditions that make for successful interventions in this area in response to COVID-19. Webb, Wyness and Cotton, 2017, in a narrative synthesis review for the Higher Education Academy suggest that involving families and communities, not just students (pp. 18-19), contributes to the success of widening participation interventions.

Review assessment arrangements for school-leaving examinations

Some of the harm linked with the disruptions to school-leaving examinations in 2020 was associated with the distress and confusion about changing grading arrangements and awards, because of the implications for higher education entry. Views articulated in some of the surveys summarised above, noted that teacher assessed examinations were unfair to particular cohorts of students, notably those from social groups that historically did not gain university entrance qualifications. The implication is that a review is needed of assessment arrangements, that takes on board both statistical modelling (as done by Lee, Stringer and Zanini, 2020) and views about this process, particularly if teacher assessments, which may be biased, will necessarily comprise a significant proportion of grades awarded in 2021. Some experimental studies question the perception of teacher bias. Rimfeld, Malanchini et al (2019) drew on the UK-representative Twins Early Development Study (TEDS) sample of over 5,000 twin pairs studied longitudinally from childhood to young adulthood (age 7-18) and used teacher assessment and exam performance across development to investigate the associations between teacher assessment and standardized exam scores, as well as teacher assessments' prediction of exam scores at ages 16 and 18, and data on university enrolment. The study found teacher assessments during compulsory education were as reliable, stable and consistent between examinations as standardized tests. But using twins as the comparator does not get at the problem of associations with race, ethnicity, class or location. From a different perspective. Rasooli, A., Zandi, H., & DeLuca, C. (2018) in a systematic review not just of the literature on assessment, but also that on fairness, drew out the range of ways in which fairness in relation to classroom assessment was understood and practised by students, teachers and school administrations. They conclude that there is a need for wider ranging discussions of classroom-based assessment linked with classroom interactions. The dislocations between approaches to assessment and to learning (Baird, et al, 2017) and between school-leaving examinations, university entrance requirements and student attainment (Baird, Andrich, Hopfenbeck and Stobart, 2017, Elliott et al, 2019 ; Hellas et al, 2018; Jenkins and Leung, 2019) are long-running topics of debate. Interventions that can trial and consider alternatives to high stakes testing at school leaving age and that are responsive to the needs of a diverse range of students and higher education pathways are urgently needed.

Mitigations to harms to participation in higher education

The literature on the harms linked with the pandemic, summarised above, noted accounts of poverty, mental illness, reduced wellbeing, gender-based violence, and lack of access to support services. Eighteen systematic reviews looked at interventions to address specific harms and their knock-on effects. These interventions are discussed separately, although many studies note interconnections between interventions.

Interventions to address student poverty or severely reduced financial resources

There is a substantial literature documenting the outcomes of hardship grants to students although the majority of studies are from the US, where higher education is extremely expensive and there are wide income gaps. Webb et al (2017, 14-15) document some of the literature on the National Scholarship Programme in the UK (2011-2015), although they note evaluations focused on the numbers involved, rather than experiences. The literature reviewed in the systematic reviews draws on literature from UK, USA, a wide range of other English-speaking countries, and some high- and middle-income countries (Nguyen, Kramer and Evans, 2019; Webb, Wyness and Cotton, 2017; Herbaut and Genven, 2019).

Three reviews conclude that grant aid, particularly when well directed to specific groups of students and generous enough to cover fees and living expenses, contributes to students from disadvantaged groups completing their studies. Webb, Wyness and Cotton (2017) note that targeted funding grants linked to specific programmes or groups of students were effective in supporting retention (pp 28-29). Nguyen et al (2019) conclude that grant aid increases the probability of students persisting with their studies and completing their degrees by two to three percentage points, and estimate that an additional \$1,000 of grant aid improves both within year and year-to-year attainment by 1.5 and 2 percentage points. Herbaut and Geven (2019) point out that needs-based grants consistently appear to improve the rate of higher education completion in contrast to merit-based grants which do not improve the outcomes for disadvantaged students.

None of the literature reviews we identified addresses harms associated with poverty affecting university students after a disaster. However, one primary research study undertaken in the wake of the Aquila earthquake in Italy, notes how there was no disruption to student enrolment and participation after the disaster because of the effectiveness of student grants and other payments in mitigating some of the worst effects (Cerqa and Di Petro, 2015).

Interventions through university wellbeing services and student unions

The harms associated with students' mental illness and reduced wellbeing noted above, have been the focus of specific reviews of the effectiveness of interventions with higher education students to address loneliness (Elard, Dennison and Tuomin, 2021), sleep disruption (Freidrich and Schlarb, 2017), and mental health concerns (Worsley, Pennington and Concoran, 2020; Kunzler, Helmrich et al, 2020;). Specific studies of interventions with healthcare students (Montagni et al, 2020; White, Foster et al, 2020) were also reviewed.

Short-term interventions using CBT, psychosocial support, and mindfulness have been shown to be effective and have modest positive impacts on recovery (Ellard et al, 2021, Freidrich and Schlarb, 2027, Worsely et al, 2020), but Montagni et al (2020) concluded there was no evidence of long-term benefits associated with these methods. White et al, (2020) reviewed 23 studies with healthcare workers, including, but not only focusing on students reporting on 19 trials on peer support highlighting considerable heterogeneity in the forms of support, some delivered on line, but noting how peer support, including the support of managers had positive impact,

One caution emerges from the generally positive assessments of online provision and use of mental health and wellbeing advice (White, Foster and Marks et al, 2020) is

associated with O'Day and Heimber's study (2021) of links between loneliness amongst students and excessive social media use. This also may have implications for interventions around online learning (see below).

Mainstreaming wellbeing support into general approach to learning and teaching

Two reviews and one article based on interviews have examined students' exposure to extreme levels of distress. Sikstrom et al's (2019) scoping review looked at what is known from the existing academic literature about grief training in medical school, residency programs and continuing professional development in psychiatry, family medicine and paediatrics. Pessangano et al (2014) undertook twenty in-depth interviews with medical students based on their experiences of dealing with patient death. Harrod, Goss et al, (2014) discussed mitigations for students at risk of suicide. 'All conclude that while existing education programmes teach students what to do regarding selfcare they do not provide guidance on dealing in depth'. Sikstorm et al (2019) suggest this approach is useful up to a point, but that more intense engagements with how to grieve and deal with mourning and build support for students is needed in thinking about reforms to medical education. Pessangano et al (2014) record that when students were invited to express grief and participate in rituals of mourning this helped support their learning about practice. Although these studies deal with the very harshest experiences that students and staff may have had during the pandemic, the form of mitigation, with regard to a wider review of learning and teaching within a particular discipline in order to maintain wellbeing, connects with findings from the literature reviewed by Worsely, Pennington and Concoran (2020) which shows that general improvements in learning and teaching approaches at an institutional level for higher education students, support mental health and wellbeing.

Addressing gender-based violence

There were only hints in the literature on the harms associated with the pandemic reviewed above that gender-based violence was an element to attend to. The lack of substantive work on this theme must be placed in the context of a literature based on empirical studies on sexual harassment and gender-based violence in universities which was growing in the UK before the pandemic (Myers and Cowie, 2019; Marine and Lewis, 2020; Long, Hubble and Lewis, 2021) and reviews have highlighted a growth of domestic violence associated with COVID-19 (Piquero et al, 2021) although, as noted above, sexual harassment and gender-based violence were not dealt with in depth by any of the studies discussed in the review of harms associated with the pandemic. However, extensive press reporting and a number of descriptive accounts (for example, Sri, Das, Gnanapragasam, S & Persaud, A. (2021). Bailey, Flynn and Henry, 2021) signal the need to include this as an important group of harms, particularly as a number of studies draw out that universities often fail to adequately support or prepare students to deal with violence against women and how to provide support (Bradbury Jones et al, 2021).

There are very few systematic reviews of mitigation strategies addressing gender-based violence in universities. Many of the published studies listed in Appendix 7 deal with wider settings, be these humanitarian crises (Noble, Ward and French, 2017) or adolescent girls in low-income countries (Yount, Krause and Miedema, 2017). However, Sammut, D., Kuruppu, J., Hegarty, K., & Bradbury-Jones, C. (2021) reviewed studies analyzing forms of higher education courses which were most effective in

informing students and giving them appropriate ways to counter gender-based violence, concluding that interactive educational strategies yield better results than didactic approaches, and a focus on practical application of learning through longer programmes were more effective in changing attitudes than brief presentations. Haberland's (2015) review of studies that used curriculum and pedagogy to talk about sexuality and HIV education, emphasized that the most effective were those that deal with aspects of gender and power. Although the wider programmes that deal with gender-based violence in the wake of disasters are all concerned with aspects of poverty, displacement and hierarchies of patriarchy that are contextually different to the UK milieu, it appears there are many issues that are apposite relating to the creation of safe spaces, networks of support, providing adequate financial resources, supporting positive media messages, and adhering to policy and practice concerning social protection (Noble, Ward and French, 2017).

Mitigations to harms to the quality of higher education

The harms associated with quality described outlined above were mainly linked with the disruption of face-to-face teaching and learning. In reviewing the literature on mitigations of these quality issues, there is considerable debate about whether or not the switch to online learning constitutes a harm or not. Other harms associated with decline in quality derive partly from a lack of preparation by management and staff to deal with or manage a pandemic or disaster with knock-on effects for students' learning.

Using online learning in ways appropriate to specific programmes and students

Reviews of studies of science (He, Yang et al, 2020) and medical students (Pei and Wu, 2020; Wilcha, 2020) conclude that online learning is not associated with poor progress or diminished understanding and can in fact improve peer mentoring for medical students (Wasson et al, 2016). Petit et al (2021) review literature detailing online examinations for orthopedic surgery, and are enthusiastic about the potential of the approach. Vaona et al (2018) looked at RCTs which compared e-learning with traditional face-to-face instruction amongst health students, although some comments about the framing of their question and data included have been raised (Whiting and Car, 2018) and the study's claim to present results across all areas of health education is not sustained by the range of studies concluded. Vaona et al (2018) conclude that, when compared with traditional learning, e-learning may make little or no difference to patient outcomes or health professionals' behaviours, skills or knowledge. But commentators on this study note that a wider range of material might have yielded different results, and that the dichotomy of traditional learning and loosely defined e learning, misses many forms of blended learning delivery (Whiting and Car, 2018).

Other studies of online learning provision in a wider range of subjects (Martin, Sun and Westline, 2020) discuss cognitive and emotional gains but do not provide any details about how these are developed. Bengtsson (2019), in a systematic review of the effectiveness of retaining learning after taking examinations at home among university students, notes that this is an effective strategy for higher order learning /analysis but not for lower order forms of information retention. Dymont and Downing (2018) reviewed 492 articles on online teacher education in Australia and other countries. While they argue that this form of provision is innovative, they do

not discuss how effective programmes are in building knowledge and understanding amongst student teachers or those they teach.

Contrary to these studies are reviews of literature and some primary studies that document how online provision heightens inequality between students, particularly along digital divides and associated with uneven prior learning (Cacault et al, 2021). Webb, Wyness and Cotton's (2017) systematic review points to mixed evaluations in the literature for online provision regarding addressing inequalities (35-36). Theobald et al (2020) draw out how active learning approaches provide particular benefits in STEM courses to those from historically disadvantaged backgrounds, and these approaches can be delivered online and offline. But Miller's review (2016) notes there is a lack of literature documenting effects of online innovations on bridging the attainment gap between students from ethnic minorities and others.

Given this mixed picture in the literature, general mitigations associated with the widespread switch to online learning during the pandemic appear not to be required, but mitigations should be developed linked with the learning needs of specific student groups and the teachers who work with them. These may encompass groups of education and health professionals and students from historically disadvantaged groups. Regarding health professionals, the literature suggests online learning should not be used as a substitute for medical students' practical experience (Wasson et al, 2016) and that if place-based teaching is not possible, very careful simulations or considerations of those conditions are needed in online teaching and learning materials.

While online or remote delivery of teacher professional development was deemed efficient in a rapid evidence review conducted for the Education Endowment Foundation (2020), there is limited research on the outcomes of online initial teacher education and how this links with teachers' professional skills and the learning outcomes of those they teach. Dymont and Downing (2018) reviewed 492 articles dealing with online teacher education, mainly in Australia. They document some of the innovations online courses introduce, but note that their effectiveness is unclear (p 329). The effectiveness of online teacher education courses in developing teachers' technological knowledge was reviewed by Moore-Adams, Jones and Cohen (2016) in a systematic review of literature on preparing teachers for online programmes using a TPACK (technological, pedagogic content knowledge) system to assess teachers' knowledge gained through these programmes. They note the limited research base for assessing teacher development through online courses, but their focus is only on technological learning as a particular subset of teaching not the full range of knowledge and skills needed in professional development for teacher educators and teachers using online environments. A study of online professional development looking at teachers' knowledge and student outcomes by Bragg, Walsh and Heyeres (2021) identified a number of studies reporting on teachers' improved knowledge, and engagement through online courses, identifying design elements which can be incorporated into programmes, but also remarked on the limited research base in this area. It appears that many facets of teacher education which include understanding the differential learning needs and responses of differently situated children, classroom management, and the professional relationships to be built and maintained in a school, may be particularly difficult to cultivate online. Although supportive learning communities can be associated with online learning, Webb, Wyness and Cotton, 2017, 35-36) conclude face-to-face interactions are also needed. Thus, even if

sections of teacher education programmes can be delivered online, learning in schools remains important.

A number of studies consider online delivery as useful in providing customised accommodations for students with different kinds of disabilities (for example, Terras, Anderson, & Grave, 2020) and various assistive technologies are also noted as useful in Ko & Petty's (2020) scoping review of the literature. But these works need to be set in the context of stigma for students disclosing disabilities to access particular accommodations (Watefield and Whelan, 2017; Eccles, Hutchings and Hunt, 2018). These processes have been largely studied in face-to-face university classrooms, and the ways in which shame and fear of disclosure may work in online or blended settings needs considerably more attention. The need to consider the roles of students, staff and management in these processes are highlighted in a qualitative study of multifaceted psychosocial disabilities experienced by students at a university in South Africa by Vergunst and Swartz (2020).

The studies reviewed thus suggest that, while online provision is not always associated with a decline in quality, particular mitigations, including some face-to-face provision, or some institutional leadership to provide additional resources for specific groups of students disadvantaged by online provision is necessary.

Teaching and researching about disasters and pandemics as part of mainstream higher education curriculum and research programmes

The harms associated with reduction in quality of education during COVID-19 noted by Scott (2020) and Watermeyer et al (2021) are partly linked with the speed with which changes had to be introduced and the ensuing difficulties in maintaining quality in learning and teaching. One systematic review of the literature on programmes to prepare medical students for disasters (Ashcroft, Byrne 2021) indicate positive wider learning outcomes from discussing this material in mainstream course development. This point is echoed in Hustona and Di Pietro's (2007) study of staff engaging with students' anxieties in a US university at the time of the terrorist attacks of 2001. These studies suggest that interventions to mainstream thinking about disasters (health or environmental) into teaching and research may be useful way for staff to feel less disoriented in a future pandemic or disaster and thus for their teaching to be more engaged in helping students to address rather than ignore anxieties around a particular moment of upheaval or distress. Some learning strategies suggested for consideration with regard to teaching about disasters include web-based simulations (Cooper, Forino, Kanjanabootra, & von Meding, 2020), crisis curriculum analysis (Govender and De Villiers, 2021), building community resilience through networks with the communities where a university is located (Smith, Burkle et al, 2018) and disaster awareness and resilience in partnership with schools (Mutch, 2018). The need to move beyond anecdotal and descriptive accounts of these processes to understand the link more closely with building a curriculum in higher education, developing appropriate pedagogies, innovations, and connections for research work with communities to engage with ideas about higher education and the public good under the shadow of current and future disasters is an important challenge.

Improving higher education disaster management planning

An important mitigation for the harms associated with reductions in quality in teaching and research is associated with planning, information exchange, and student and staff support. Shamsir et al (2021) review the literature on planning for higher education institutions in response to SARS and COVID-19 and recommend the development of a Haddon matrix to facilitate planning and preparation. (The Haddon matrix identifies planning stages for a disaster noting steps associated with prevention, minimizing hazards, and provision of care and re-habilitation, noting actions to be taken pre-event, during the event, and post-event.) A number of studies reflect on what has been learned by university leaders through COVID-19 (Giglioti, 2020), the appropriate indicators to develop (Camileri, 2021) the gaps in planning and information exchange revealed by recent environmental disasters (Doheny, de Roiste, 2020; Gomez, 2013) and the skills needed by higher education leadership teams in the wake of events like Hurricane Katrina (Kahn and Sachs, 2018). However, the literature on higher education leadership and disaster risk management, as noted by Smith, Burkle et al, (2018), is mainly anecdotal and in need of conceptual development and empirical study.

Mitigations to harms to higher education outcomes

The harms noted with regard to specific omissions in higher education learning during COVID-19 link to specific degrees and the consequences for employment opportunities and performance in work need to be situated in the context of a large literature on the mismatch between graduate skills and labour market needs reviewed for low- and middle-income countries (Howell, Unterhalter and Oketch, 2020) and for high-income countries (Osmani et al, 2018; Abelha et al, 2020). Biagi et al (2020) in a systematic review of literature on this issue highlights extensive literature on employer demands for team working, communication, and problem solving, all of which could have been enhanced, not diminished by the online provision of university courses, as a number of studies of higher education under COVID-19 note (e.g., Peimani et al, 2021; Lee et al, 2021; Kumar et al, 2021). However, as detailed, above the harms identified were linked to very specific elements of professional training, for health workers and teachers which had to be omitted or changed. The mitigation outlined below entails accepting this situation and looking at practices to move forward.

Supporting graduates into work: partnerships between HEIs, employers and policy makers)

Beaglehole, Mulder et al (2018), in a systematic review and meta-analysis, found that high levels of anxiety and distress occur following natural disasters. In particular, they found heightened anxiety concerning employment opportunities, although there is considerable heterogeneity in the literature as responses varied for different groups in relation to different kinds of disasters. They note the importance of mitigating strategies, where possible. These varied outcomes are also noted by Russo, Silva et al (2021) who reviewed the effects of economic recessions over fifty years on health workers. Studies note both high demand for their skills, the effects of austerity limiting the growth of health systems, burn-out, declining motivation, and a proliferation of low-paid work exacerbated by discriminatory labour market conditions. The study prompts the development of a framework that gives central attention to protecting and enhancing the education and work conditions of health

workers as a key element of building and sustaining health systems after financial disasters. This focus on reintegration and rehabilitation of health workers and graduates with visions of social development is also a feature of literature reviews on post-conflict recovery (Rayes and, Meiqari, 2021; Howell, Unterhalter and Oketch, 2020). The implication is that while higher education institutions cannot protect graduates from economic, political and social upheavals, they can give certain forms of knowledge, understanding and skills to help mitigate some of the worst effects.

The review by Torani et al (2019) suggests that building in knowledge about disasters and networks of support during major upheavals into higher education programmes can support post-disaster recovery. Chappel and Richards' (2015) review of nursing training involving both a systematic review and empirical data collection looks at links between length and quality of transition programmes for new graduate nurses and later clinical leadership. While this study documents only one profession, it suggests the length and quality of ways universities keep in touch with graduates and the work settings they enter supports the professional work that ensues and can contribute to agendas to 'build back better'.

Developing partnerships to enhance research and innovation in response to disasters

The short-term decline in funding for research and innovation noted as an emerging harm, requires some sure-footed mitigation. Mazzucato and Kattel (2020) note the importance of a range of innovative partnerships between governments and research communities to mitigate the effects of disasters and prepare for future shocks, themes also developed in Mazzucato's (2021) book dealing with responses to multiple crises. There is a considerable literature on organisation responses to crises with many nuances drawn out regarding different forms of crisis and response (eg Sellnow and Seeger, 2021; Williams, Gruber, Sutcliffe, et al, 2017) but we found no systematic review of how disasters or pandemics have affected research in specific disciplines, research cultures, or the range of methods deployed. Some pandemics, such as HIV, have led to developments of whole new areas of research. For example, school-related gender-based violence was not much studied before the pandemic manifested itself in Africa, but is becoming a major area of health, education, and wider social policy research in its wake (Andersson, Cockcroft and Shea, 2008; Greig, Peacock, Jewkes et al, 2008; Parkes et al, 2016). The process of *how* this kind of development happens in a higher education sector and *what* supportive strategies are needed remains in need of rigorous examination.

Connections

Partnerships in knowledge and organisation building

From the evidence reviewed above, specific harms associated with a disruption of the connection between higher education and the societies in which the sector is located were associated are linked mainly with failing to deliver on opportunities for the least advantaged, good learning and teaching for those who work and study in universities, and inadequate preparations for work post-pandemic. However, the literature on academic partnerships in support for communities during disasters and in the process of recovery does not look closely at these issues within system processes. Seyedin and Ghanizadeh's (2019) systematic review of academic partnerships in disaster recovery highlights the importance of academic and community partnerships in preparing for disasters, organising relief, and building

recovery, and the crucial role of education and training in this process. Howell, Unterhalter Oketch (2020) in their review of higher education and the contribution to a range of development outcomes, conclude that despite a literature on many missed opportunities, and initiatives that do not align well or reproduce inequalities, there is clear evidence of the potential for higher education institutions to contribute to work on developing necessary understanding. Studies document how this happens through specific partnerships and forms of organisational participation, both of which are needed for development and recovery from disasters (see also Unterhalter and Howell, 2021).

Increasing local community support for higher education institutions

Some of the difficulties noted in sustaining successful programmes for widening participation are associated with the ways in which these programmes become focused on individual students or schools, not on whole communities (Webb, Wyness and Cotton, 2017, 17-18). There is an extensive literature on communities who are subject to discrimination and exclusion, and collective initiatives to use educational opportunities to challenge these issues (Ladson Billings, 2017; Jones and Reddick, 2017; Badat, 2020). Seo et al's (2021) review of literature on civic engagement and disaster risk reduction shows the importance of education as a key site for building community coherence. The links between locally situated universities, economic development and the growth of civil society were positive development outcomes noted in the literature discussed in Howell et al's (2020) review of higher education in low- and lower middle-income countries. Together these threads suggest interventions which work to support the civic roots and networks associated with universities can help to mitigate some of the harms associated with some lack of interest in, and engagement with, higher education which was sharpened for some groups by the pandemic. There appears considerable potential to address forms of suspicion and hostility through sustained local engagements.

Opportunities, difficulties and threats

Two kinds of opportunities and threats are proposed in the literature – longer-term institutional transformations and shorter-term 'quick fixes'. The threats associated with longer-term processes of change are that they take many different directions and initial goals are not always fully realised. Threats associated with short-term interventions are that they may 'fix' only one part of the problem (van Schalkwijk et al, 2021).

Regarding opportunities that involve whole institutions a number of studies propose processes that are structural and comprehensive and that require a range of changes to policy and practice involving governments, institutions, their staff and students. Chief amongst these are approaches to student finance. The current arrangements for financing higher education in England entail high levels of student debt, and precarious livelihoods for many students and staff. Changing these conditions is not a 'quick fix' and requires mitigation looking at the findings from reviews of student financing across a range of contexts taking account of the least advantaged, whom as so much of the literature on the pandemic shows have borne the brunt of the hardships of the pandemic. In the short term Montacute (2020) noted that through much of 2020 fulltime students were not eligible for universal credit and were not initially identified as a group for whom specific national support was deemed necessary. In December 2020 £20 million was made available to universities in

England for hardship grants to students, followed by a further £50 million in February 2021; in Wales £40 million was allocated in January 2021. Research on how these funds were distributed will be useful together with an assessment of their effectiveness in addressing the range, scale or depth of the harms associated with lack of adequate finance. There is a need for some review of this. Short-term actions for mitigation around financial need is effective, as detailed above, but there is a need to think about this in relation to the broader question of how higher education is funded and the fee requirements of students. A range of fee regimes have been looked at over the last ten years (Dupuy and Ertl, 2014; Carpentier, 2021). Czarnecki, Korpi, & Nelson, (2020) compare student support and tuition fee systems across OECD countries and show that student support is less generous in countries that concentrate benefits on students from low-income families. Thus, the fee system in England and Wales was one that had inbuilt design features that tended to exacerbate student hardship for the least advantaged. This points to the need to address how students are supported financially to enter and remain in higher education, developing long-term comprehensive strategies for widening participation and improving learning, teaching and support strategies to take account of wellbeing mental health issues.

A second form of long-term whole-institution approach to emerging opportunities concerns disaster planning and openness regarding risk and vulnerability. One of the key lessons that emerged from the experience of the HIV crisis in higher education was that the illness was seen as the problem of particular stigmatised groups. Although there was some provision for their needs (Aggleton, Yankah and Crewe, 2011), there was a reluctance to take on full-scale institutional reviews to consider teaching about HIV to protect students (Aggleton et al, 2018). Assessments in the wake of 30 years work on HIV education point to the importance of considering context and diversity (ibid) suggesting the need for whole institution approaches that take account of the range of people working and studying in higher education. The different functions of higher education outlined in this review (See Appendix 1) underline the complexity of considering teaching, research and community engagement as part of this process.

Reviews of disaster risk management highlight how unevenly this has been done in the higher education sector. Izumi, Sukhwani, Surjan, & Shaw (2020) surveyed 150 respondents in 65 higher education institutions in 29 countries and found that just under half lacked a general business continuity plan for an emergency. This study does not comment on whether differential needs, particular for the least advantaged are or are not built into these plans. But the lack of specific preparations for this group in the UK needs consideration, so that mitigation strategies are appropriately targeted and do not further exacerbate the hardships they would address.

A third area for institutional action concerns reviewing learning and teaching. A number of evidence reviews of approaches to mitigation with regard to disruptions to learning note the importance of improving learning and teaching approaches both with regard to enhancing access and participation either in the wake of disasters or in response to forms of persistent inequality or exclusion. Younger, Gascoine, Menzies, and Torgerson (2019) in their review of approaches to widening participation identify a range of longer-term engagements with improved learning and teaching in schools and higher education. Interventions aimed at enhancing general learning and teaching processes are also identified as effective in addressing harms associated with reduced mental health and wellbeing as shown by the works

on interventions to address student anxiety reviewed by Worsely, Pennington and Concoran, 2020. Ashcroft, Byrne, Brennan, & Davies' (2021) systematic review of programmes to prepare medical students for disaster training indicate positive outcomes when courses on disaster preparation had been conducted. While it is difficult to extrapolate from the specifics of medical students' needs to those of other professionals (eg, teachers, education administrators and support workers) this seems to point to some useful lessons. The implications of these studies are that the quick fix provided by using online platforms is not a substitute for the longer-term attention to the relationships that need to be built around learning and teaching communities, and the management processes needed to lead this. Dohaney, de Róiste, Salmon, & Sutherland (2020) have identified the importance of these processes for the higher education sector in relation to disaster recovery and this appears apposite in relation to epidemics, as does the development of curricula that engage with disasters and risk (as noted by Ashcroft, Byrne, Brennan, & Davies, 2021) not as something far away and unusual, but as something close to home and likely to happen.

Opportunities and threats: medium and long term

In the literature consulted on past pandemics and disasters there are not many systematic reviews that deal directly with opportunities or threats for higher education institutions or education systems. However, there are some illuminating elements to highlight from selected studies which focus on three forms of disaster and disruption in higher education – the HIV epidemic, environmental disasters (earthquakes, floods and Tsunami) and armed conflict.

The HIV pandemic contributed to higher education institutions becoming more aware of gender-based violence on campuses (Haberland, 2015; Anitha and Leis, 2018). It was also associated with higher education institutions giving somewhat more attention to student welfare, support, health education and information, although this was patchy and not always well delivered (Chetty, 2003; Heeren et al, 2013; Gobind and Ukpere, 2014). Eaton and Kalichman (2020) draw out how four decades of HIV research into responses to diagnosis, treatment and risks brought attention to the links between health, education, and social development. This illuminates important aspects of understanding the dynamics of communities, stigma and the need to address existing forms of inequality. All are highly pertinent for the higher education sector in confronting opportunities and threats arising from the COVID-19 pandemic

Disasters and conflicts: There are very few systematic literature reviews on major environmental disasters (eg Fukushima, Kyoto, SE Asian Tsunami) that highlight long-term opportunities and threats with regard to the higher education sector. Some studies (for example, Shigemura et al, 2021) note the importance of paying attention to psychological effects and psychosocial processes of those directly and indirectly involved. Building more sustained links with communities and openness to some of the complexities of conflicts is noted in literature reviews on higher education in conditions of war and armed conflict (Milton and Barkat, 2016; Unterhalter Howell and Oketch, 2020).

DISCUSSION AND CONCLUSION

This rapid evidence review set out to investigate the research evidence on: (i) the harms created by the COVID-19 pandemic in the higher education sector; (ii) effective mitigations for these harms and (iii) new opportunities and threats which may emerge to further enhance or limit the provision of higher education. The evidence on the harms created by pandemic is very preliminary and partial as the review has been conducted at a time when many of the effects of the pandemic on higher education are still emerging, and there have been limited opportunities to document changes over time, or draw on a range of complementary research methods. Nonetheless the harms summarised in this report point to the key issues of pressures on widening participation strategies, financial hardship for students, stress and anxiety, uneven or truncated learning experiences, and difficulties for management in planning in the short- and medium-term.

Table 3 lists the harms outlined above with effective mitigation strategies identified through a discussion of selected systematic reviews. The mitigations identify a focus for government policy and review (grants and financial support, reviewing high stakes testing linked to university admission, addressing gender-based violence, and engaging with civic university initiatives), and areas for institutional planning and development: widening participation programmes, civic engagement, development of mental health and wellbeing services, improvements in learning and teaching taking account of disasters, disaster planning for higher education, improving policy and practice on gender based violence, learning from the experience of online provision and developing specific programmes for different groups of students, and developing programmes to keep in touch with the pandemic graduating classes to support their transition into work and future careers.

Table 3 Harms and possible mitigation strategies

Harms	Mitigations
Access	
Exclusion of students from historically disadvantaged groups and disruption of widening participation initiatives	Tailor programmes for secondary school pupils from historically disadvantaged groups to support successful enrolment in higher education
Changes to school leaving examinations & university enrolment	Trial and consider risks and opportunities for historically disadvantaged groups associated with teacher based final assessments and the link between assessment and learning

Participation	
Student poverty and reduced finance	Generous financial support with fees and living expenses
Reductions in mental health and wellbeing	More extensive provision of wide range of mental health and wellbeing services, with easier access to services
Gender based violence	Developing appropriate policy, provision for safe spaces and financial support, and developing courses of sufficient length and depth
Quality	
Changes in curriculum and pedagogy through online delivery	Adapting online or blended learning in ways appropriate to specific programmes and students
Stress and distress amongst staff and research students	Teaching and researching about disasters and pandemics as part of mainstream higher education curriculum and research programmes
Lack of management preparation for pandemic	Improving higher education disaster management planning
Outcomes	
Reduced job opportunities for graduates due to disrupted education	Supporting graduates into work through partnerships between HEIs, employers and policy makers
Connections	
Diminished motivation of historically excluded groups with entering university	Increased civic university engagements
Concern with increased inequalities and reduced support for ideas about connection between higher education and public good	Build partnerships in knowledge development, teaching and organisation building

The brief review of opportunities and threats highlights the importance of not seeing the pandemic as a single moment affecting only certain groups in particular ways, but using experiences to improve the system of students financing, deepen and expand provision of wellbeing and mental health services, and enhance learning, teaching,

research and planning taking account of the vulnerabilities (both shared and different) in our communities.

Strengths and limitations of the review

The strength of this review was the collaboration between topic specialists and systematic review experts, ensuring a rigorous process for identifying and reviewing the literature on harms in the UK. However, as a high volume of material in this area is being published, the review remains a snapshot of a fast-growing field of scholarship. The wide scope of the field to be synthesised when looking at mitigation studies in a short period of time, means that the reviews selected for comment are those most easily accessed drawing on the knowledge of the review team, and that a much wider and deeper range of studies remains to be discussed in more detail. Thus, the mitigations highlighted must be considered as a first step to a more thorough investigation.

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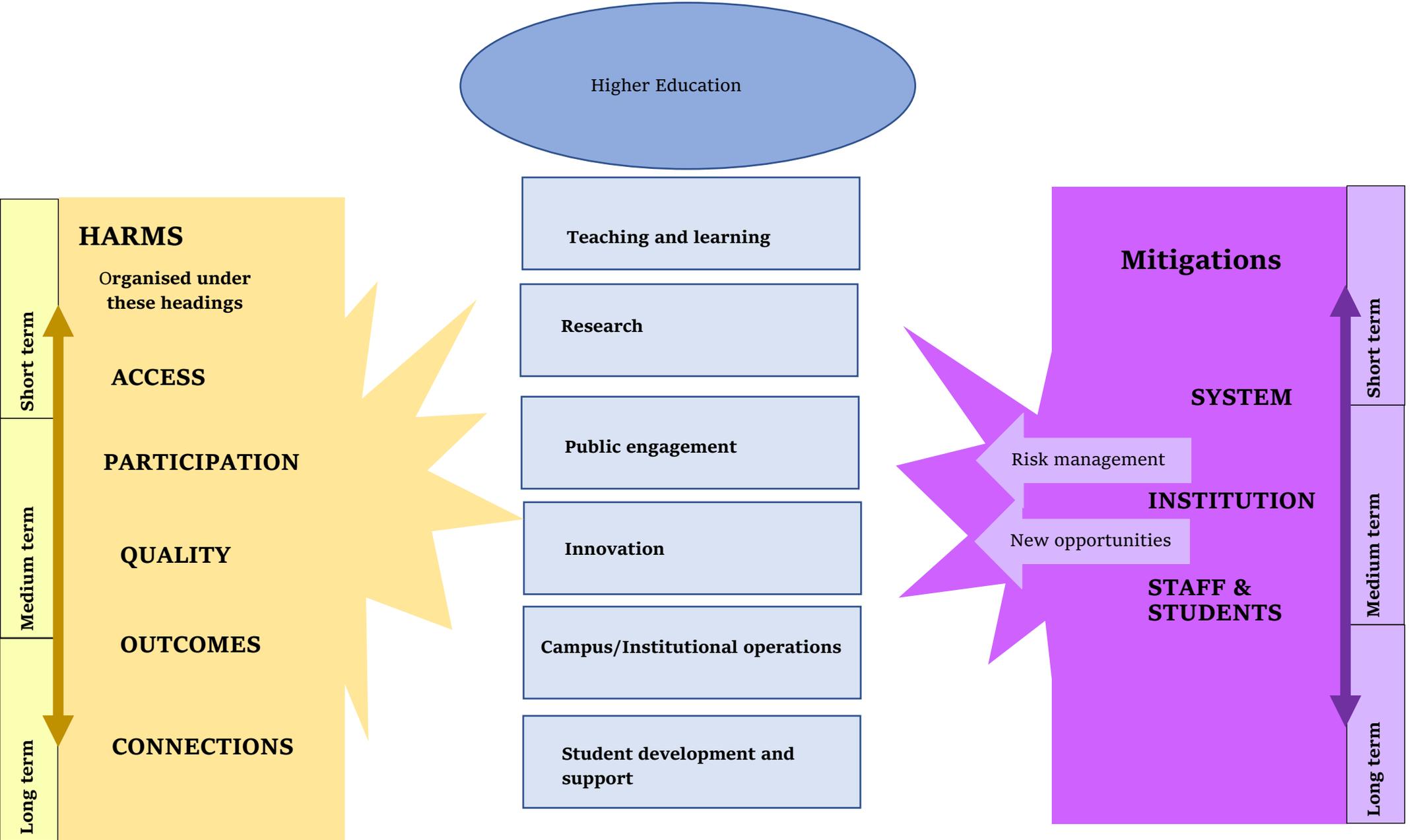
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APPENDIX 1: CONCEPTUALISING HARMS



HARMS	
ACCESS	<ul style="list-style-type: none"> • Indirect Groups at Risk (e.g., those with extended caring responsibilities) <ul style="list-style-type: none"> ○ Vulnerable children and SEND children ○ Gender and social group
PARTICIPATION	<ul style="list-style-type: none"> • Mental Health • Well-Being & Development • Physical Health • Nutrition • Misuse of Substances • Domestic Violence • Support Service Access • Gender and other social group
QUALITY	<ul style="list-style-type: none"> • Training of key workers, especially teachers • Graduate skills
OUTCOMES	<ul style="list-style-type: none"> • Learning loss / Educational Knock-on Effect • Immediate Earning Capacity Changes [for children? Those entering the work force?] • Gender & Social Group Imbalance Widening (long term harm) • Changes in socioeconomic status (SES) (long term harm) • Knowledge production
CONNECTIONS	<ul style="list-style-type: none"> • Ongoing professional development of key workers, especially teachers

APPENDIX 2: METHODS

Inclusion criteria

Stage 1: identifying harms

Studies were included if:

- Published since November 2019
- Related to COVID-19
- Reported data UK or/and Northern Ireland populations
- Reported empirical evidence
- Reported data collected from university populations
- Reported data on harms [or impacts].

Studies were included if they draw on quantitative or qualitative research designs, comprise systematic reviews or secondary data analysis. Studies were included if they demonstrated credibility around claims made offering well-founded and plausible arguments about the significance/importance of the insights/findings generated. In particular for small scale studies where findings and claims have been understood and interpreted in context (Nutley, Powell, and Oakley Davies, 2013, Gough, 2016). Certain studies were included in the review if they partly met criteria because of the insight they may provide into the process of COVID-19 related harms and higher education. These studies have all been discussed in relation to other confirmatory work on the same issues.

Rapidity has been achieved by limiting focus to only looking at universities; overlooking other kinds of tertiary education institutions, and thus missing some specialist implications for particular areas of technical and vocational education; and not looking at effect on employment beyond university.

Articles were excluded that did not meet defined criteria (see Table 4).

Table 4 Exclusion criteria

Definition
Published before December 2019
Not COVID19
Not UK
Not empirical study or systematic review of empirical studies
Not university
Not harm-related *
Including full-paper screen

* as broadly defined by DfE criteria.

Evidence presentation

The literature on the UK was classified to a range of harms and with some synthesis made of how these harms impact both on the functions of the higher education sector, and its relationship with other phases of education, and other sectors of the society and economy. In considering approaches to responding to these harms, literature from outside the UK has been surveyed and studies included in the review that look at responses by higher education institutions to pandemics, environmental disasters, and conflict, drawing out what forms of mitigation have been adopted, what opportunities have opened up, how HEIs have responded and what some of the implications for other parts of the education system are.

2) **Stage 2: identifying mitigations** - we searched for systematic reviews that evaluated interventions that aimed to mitigate the harms identified in the first part of the review, both short-term mitigation of harms identified and longer-term adaption to prevent the harms. Studies were included if they were:

- Published with any date
- Evaluated an intervention related to mitigation or adaptation relating to an identified harm
- Any geographical area
- Reported data collected from an adult population who have experienced or risk experiencing the harm. (Given the timeline of this pandemic the population is not restricted to COVID-19specific.)
- Reported data collect from any setting (community, organisation of institution) so long as it was transferable to the population of interest for the present review
- Had the key features of a systematic review: described an explicit search strategy, listed the search sources, specified the inclusion criteria, and had carried out quality assessment of the included studies.

A review was not considered if it reported on prevalence, extent, or characterisation of an issue. If more than one systematic review was found for each harm or sub-harm, we selected the most appropriate review as follows:

- The most up to date systematic review to avoid double counting individual studies included in reviews as well as choosing the most up to date findings
- The systematic review most relevant/ transferrable in terms of population, contexts and topics.
- The systematic review or reviews that were most likely to have trustworthy reliable findings based on a quality assessment of the execution of the review.

Search strategy

Stage 1: search for evidence on harms:

Bibliographic databases

One author (CV) searched Proquest Central, SCOPUS and Google Scholar from November 2019 to April 2021 using search terms that were specific to our population

and education type. These included terms for COVID-19 and limited these to UK. The search terms used are in Appendix 3.

CV also searched the [IPPO Living Map](#) which is updated monthly with newly published systematic reviews relating to the COVID-19 pandemic (Shemilt et al., 2021).

Hand searches for grey literature

CV searched Google for organisations relevant to the education sector and searched the websites of any found for reports that met the above inclusion criteria.

Stage 2: search for systematic reviews of mitigations:

CV and BC hand-searched to May 2021 the following databases for relevant systematic reviews:

- [The Cochrane Library](#)
- [The Campbell Collaboration](#)
- [The Database of Abstracts of Reviews of Effects \(DARE\)](#)
- [National Institute for Health and Care Excellence \(NICE\)](#)
- [World Health Organization \(WHO\)](#)

We searched for keywords related to systematic review + search terms relevant to the harms identified, + the population and or education sector of the review. These searches were not limited to reviews of studies conducted in the UK nor to studies conducted as a result of the pandemic.

EU also searched Google Scholar for systematic reviews of mitigations linked to reduced employment opportunities for graduates after conflicts and disasters, and for higher education teaching and learning responses to disasters.

Screening methods

To expedite the screening process, we unloaded citations for harms into both Excel and EPPI-Reviewer Web (Thomas et al, 2020). EU and CH screened citations against inclusion criteria (see above). The flow of studies for harms through this process is documented in the PRISMA diagram in Appendix 4.

Systematic reviews of mitigation strategies were screened at source and full text retrieved only if relevant.

Data extraction of key characteristics of study

A full text copy of each study on harms was uploaded into EPPI-Reviewer Web from which EU and CH extracted the following data :

- Access
 - Indirect Groups at Risk
- Participation

- Mental health
- Wellbeing and development
- Physical health
- Nutrition
- Misuse of substances
- Domestic violence
- Support services access
- Gender and other social groups
- Student finances
- Quality
 - Training of key workers, especially teachers and health professionals
 - Graduate skills
 - Funding loss
- Outcomes
 - Learning loss/educational knock-on effect
 - Immediate earning capacity changes (for children/dependents or those entering workforce)
 - Widening of gender and other social group imbalances (long term harms)
 - Changes in socio-economic status (long term harm)
 - Knowledge production/research capacity
- Connections
 - Ongoing professional development of key workers
 - Other connections (public good)
- Type of study
 - Secondary data
 - Case study
 - Qualitative
 - Controlled studies
 - Survey
 - Systematic review

Synthesis methods

A narrative synthesis method was used. We grouped evidence using our framework for harms and mapped the evidence per harm by number of studies and type of studies.

For evidence for each mitigation on harm we aimed to group by how it sought to tackle the harm (e.g. prevent or treat) and in consideration of its level of relevance to COVID-19 and the strength of evidence.

Quality appraisal methods

We used the following questions were used to assess each paper's quality based on research design and evidence claim. For papers related to identifying harms, we recorded our assessment in EPPI-Reviewer Web:

What does the evidence claim? Please specify:

1. Is the nature and extent of the claim relevant to your review?

- Yes
- No
- Partly
- Unclear

2. Is the evidence claim trustworthy in using a relevant method to achieve that evidence claim?

- Yes
- No
- Partly
- Unclear

3. Is the evidence claim relevant in terms of how its focus (how it applied the method such as for eg questions asked, outcome measures etc) to address the study question and make the claim?

- Yes
- No
- Partly
- Unclear

4. Are there any aspect of the execution of the study methods that undermine your confidence in the trustworthiness of the claims being made? Indicate any concerns below for all the method specific questions below (for systematic reviews)

- (i) Please specify under the relevant methods specific question and summarise here:
- (ii) Please state whether these undermine the evidence claim:
 - Yes
 - No
 - Partly
 - Unclear

Quality control methods

The data extraction methods were reviewed by all the members of the team.

Both expert authors (EU, CH) extracted data from the included studies and undertook quality assessment resolving discrepancies through discussion.

APPENDIX 3: SEARCH STRINGS

Date searched 30 April 2021

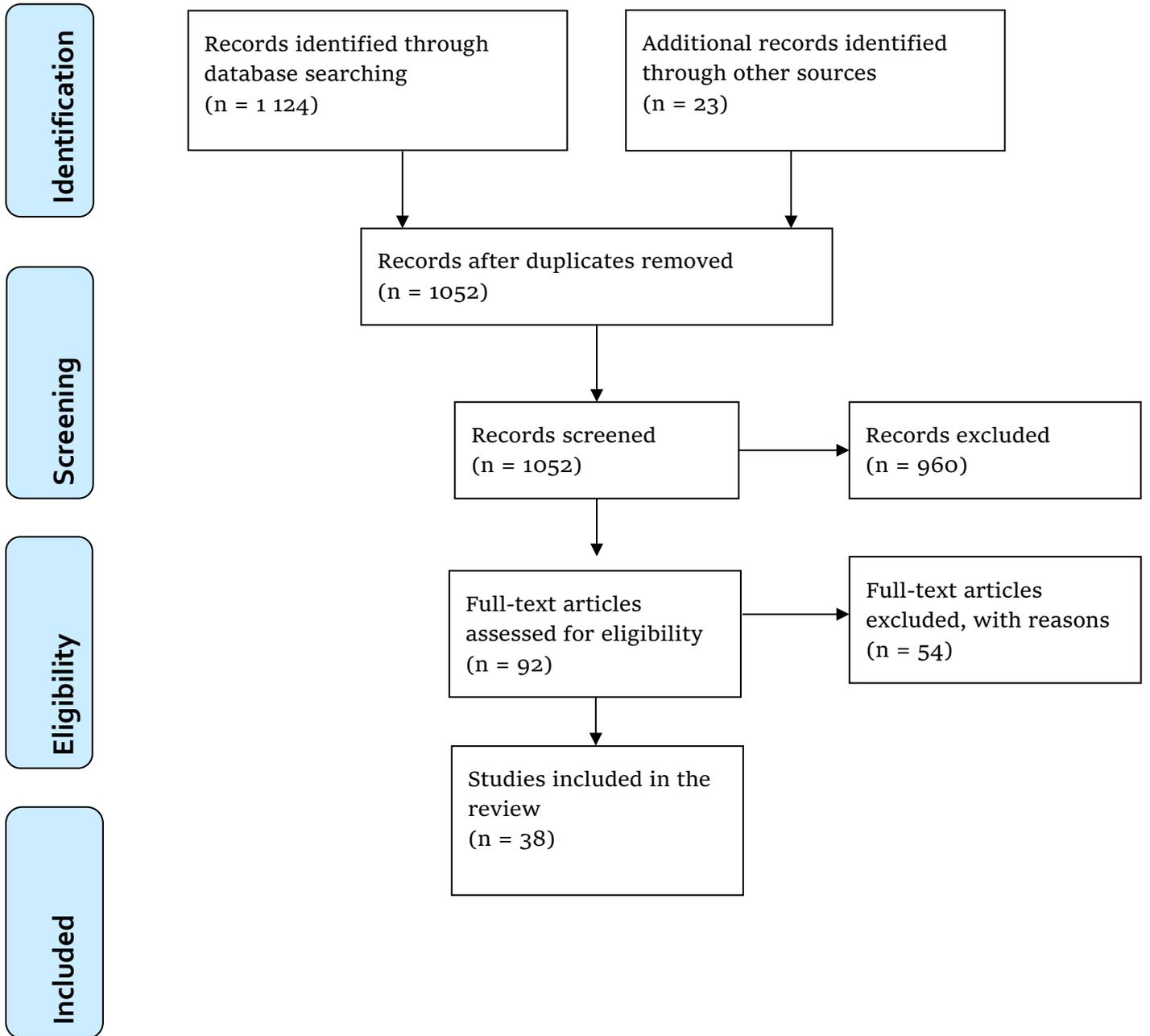
Database/platform	Search strategy	References uploaded
Proquest Central	((Ti(COVID19 OR "coronavirus 2019" OR pandemic) OR ab(COVID19 OR "coronavirus 2019" OR pandemic) AND pd(>=20180427)) AND ((Ti(HEIs OR HEI OR "higher education" OR "higher education Institution" OR University OR Universities OR postdoc OR PhD "research degree" OR masters OR PGCert) OR ab(HEIs OR HEI OR "higher education" OR "higher education Institution" OR University OR Universities OR postdoc OR PhD "research degree" OR masters OR PGCert)) OR MAINSUBJECT.EXACT("Higher education") OR (ti(graduate OR undergraduate OR postgraduate OR "student teacher") OR ab(graduate OR undergraduate OR postgraduate OR "student teacher")))) AND loc.exact("United Kingdom--UK"))	849
SCOPUS	((TITLE-ABS-KEY (heis OR hei OR "higher education" OR "higher education Institution" OR university OR universities OR postdoc OR phd "research degree" OR masters OR pgcert)) OR (TITLE-ABS-KEY (graduate OR undergraduate OR postgraduate OR "student teacher"))) AND (TITLE-ABS-KEY (covid19 OR "coronavirus 2019" OR pandemic)))	1 798 165 (UK filter)
Google Scholar		529 1 st 40 pages 110 included
IPPO (Schemilt et al, 2021)		1,289

Hand searches		18

APPENDIX 4: PRISMA DIAGRAM



Figure 1: PRISMA Flow Diagram for identification of harms studies



APPENDIX 5: OVERVIEW OF EVIDENCE OF HARMS

HARMS (38 studies included)*	Count*	Category of harm	Evidence source (ref)	Study type	Strength of the evidence
ACCESS (5)	5	<ul style="list-style-type: none"> Indirect Groups at Risk (e.g., those with extended caring responsibilities) 	Atherton, G., & Mazhari, T. (2020). University entry and the class of 2021: who is set to miss out. AccessHE	Secondary data analysis	Medium (some limitations)
			Montacute, R., & Holt-White, E. (2020). COVID-19 and social mobility impact brief# 2: University access and student finance. The Sutton Trust.	Survey	Medium (some limitations)
			Scott, P. (2020). The Impact of COVID-19 on Fair Access to Higher Education. Report by the Commissioner for Fair Access.	Qualitative study	Strong
			Smith, K. G., & Cleland, J. (2020). Drastic times need drastic measures: COVID-19 and widening access to medicine. JR Coll Physicians Edinb, 50(4), 431-435.	Case study	Medium (some limitations)

			Woolf, K., Harrison, D., & McManus, C. (2021). The attitudes, perceptions and experiences of medical school applicants following the closure of schools and cancellation of public examinations in 2020 due to the COVID-19 pandemic: a cross-sectional questionnaire study of UK medical applicants. <i>BMJ open</i> , 11(3), e044753.	Survey	Strong
PARTICIPATION (22)	13	• Mental Health	Blackbullion (2021). <i>Money and mental health: how financial wellbeing impacts students</i> . A Blackbullion whitepaper, in association with Censuswide. Available at: https://business.blackbullion.com/download/money-and-mental-health-how-financial-wellbeing-impacts-students	Survey	Medium (some limitations)
			Bu, F., Steptoe, A., & Fancourt, D. (2020). Who is lonely in lockdown? Cross-cohort analyses of predictors of loneliness before and during the COVID-19 pandemic. <i>Public Health</i> , 186, 31-34.	Survey	Strong
			Carson, J., Prescott, J., Allen, R., & McHugh, S. (2020). Winter is coming: age and early psychological concomitants of the COVID-19 pandemic in England. <i>Journal of Public Mental Health</i> , 19 (3), 223-232	Survey	Medium (some limitations)

			Evans, S., Alkan, E., Bhangoo, J. K., Tenenbaum, H., & Ng-Knight, T. (2021). Effects of the COVID-19 lockdown on mental health, wellbeing, sleep, and alcohol use in a UK student sample. <i>Psychiatry Research</i> , 298, 113819.	Survey	Strong
			Hewitt, R. (2020). Students' Views on the Impact of Coronavirus on Their Higher Education Experience. HEPI Policy Note 24. Higher Education Policy Institute. Available at: http://www.improvingthestudentexperience.com/library/covid19/HEPI-Policy-Note-27-Students-views-on-the-impact-of-Coronavirus-on-their-higher-education-experience-in-2020-21-FINAL.pdf	Survey	Medium (some limitations)
			Hussain R, Singh B and Shah N ; Jain S ;. (2020). Impact of COVID-19 on ophthalmic specialist training in the United Kingdom—the trainees’ perspective. <i>Eye</i> (London, England), 34(12), 2157–2160.	Survey	Medium (some limitations)
			Office of National Statistics. (2020). Coronavirus and the impact on students in higher education in England: September to December 2020: A summary of research into how the coronavirus (COVID-19) pandemic has affected students in higher education in England during the autumn term of 2020. London: ONS.	Survey	Strong
			Payne, A., Rahman, R., Bullingham, R., Vamadeva, S., & Alfa-Wali, M. (2021). Redeployment of surgical trainees to intensive care during the COVID-19 pandemic: evaluation of the impact on	Survey	Strong

			training and wellbeing. <i>Journal of surgical education</i> , 78(3), 813-819.		
			Scott, P. (2020). The Impact of COVID-19 on Fair Access to Higher Education. Report by the Commissioner for Fair Access. Available at: http://www.improvingthestudentexperience.com/library/covid19/impact-covid-19-fair-access-higher-education.pdf	Qualitative study	Strong
			Sneyd J R and Mathoulin S E; O'Sullivan E P; So V C; Roberts F R; Paul A A; Cortinez L I; Ampofo R S; Miller C J; Balkisson M A;. (2020). <i>Impact of the COVID-19 pandemic on anaesthesia trainees and their training. British Journal of Anaesthesia</i> , 125(4), 450-455.	Qualitative study	Medium (some limitations)
			Watermeyer R, Crick T and Knight C ; Goodall J ;. (2021). COVID-19 and digital disruption in UK universities: afflictions and affordances of emergency online migration. <i>Higher Education</i> , (81), 623-641.	Survey	Strong
			Wonkhe (2020/21). NUS Coronavirus Student Survey Phases 1-111. Available at: https://www.nusconnect.org.uk/resources	Survey	Medium (some limitations)
			Young Minds. (2021). Coronavirus: Impact on young people with mental health needs. Available at:	Survey	Medium (some limitations)

			https://youngminds.org.uk/about-us/reports/coronavirus-impact-on-young-people-with-mental-health-needs/		
17	• Well-Being & Development	Barrett, C., & Cheung, K. L. (2021). Knowledge, socio-cognitive perceptions and the practice of hand hygiene and social distancing during the COVID-19 pandemic: a cross-sectional study of UK university students. BMC public health, 21(1), 1-18.	Survey	High	
		Blackbullion (2021). Money and mental health: how financial wellbeing impacts students. A Blackbullion whitepaper, in association with Censuswide. Available at: https://business.blackbullion.com/download/money-and-mental-health-how-financial-wellbeing-impacts-students/	Survey	Medium (some limitations)	
		Bu, F., Steptoe, A., & Fancourt, D. (2020). Who is lonely in lockdown? Cross-cohort analyses of predictors of loneliness before and during the COVID-19 pandemic. Public Health, 186, 31-34.	Survey	Strong	
		Caruana E J, Patel A and Kendall S ; Rathinam S ;. (2020). Impact of coronavirus 2019 (COVID-19) on training and well-being in subspecialty surgery: A national survey of cardiothoracic trainees in the United Kingdom. Journal of Thoracic and Cardiovascular Surgery, 160(4), 980-987.	Survey	Strong	

			Choi, B., Jegatheeswaran, L., Minocha, A., Alhilani, M., Nakhoul, M., & Mutengesa, E. (2020). The impact of the COVID-19 pandemic on final year medical students in the United Kingdom: a national survey. <i>BMC medical education</i> , 20(1), 1-11.	Survey	Strong
			Evans, S., Alkan, E., Bhangoo, J. K., Tenenbaum, H., & Ng-Knight, T. (2021). Effects of the COVID-19 lockdown on mental health, wellbeing, sleep, and alcohol use in a UK student sample. <i>Psychiatry Research</i> , 298, 113819.	Survey	Strong
			Farnell T, Skledar Matijević A and Šćukanec Schmidt N. (2021). The impact of COVID-19 on higher education: a review of emerging evidence (NESNET Report). Publications Office of the European Union. Available at: https://nesetweb.eu/en/resources/library/the-impact-of-covid-19-on-higher-education-a-review-of-emerging-evidence/	Systematic review	Strong
			Hewitt, R. (2020). Students' Views on the Impact of Coronavirus on Their Higher Education Experience. HEPI Policy Note 24. Higher Education Policy Institute. Available at: http://www.improvingthestudentexperience.com/library/covid19/HEPI-Policy-Note-27-Students-views-on-the-impact-of-Coronavirus-on-their-higher-education-experience-in-2020-21-FINAL.pdf	Survey	Medium (some limitations)

			Ho, C. Y., Kow, C. S., Chia, C. H. J., Low, J. Y., Lai, Y. H. M., Lauw, S. K., & Krishna, L. K. R. (2020). The impact of death and dying on the personhood of medical students: a systematic scoping review. <i>BMC medical education</i> , 20(1), 1-16.	Systematic review	High
			Lambrechts, A., & Smith, K (2020). Impact of the COVID-19 Pandemic Crisis on Doctoral Researchers in the UK. Unpublished report, University of York. Available at: https://eprints.whiterose.ac.uk/168633/1/CV19ImpactReport.pdf	Survey	Strong
			Office of National Statistics. (2020). Coronavirus and the impact on students in higher education in England: September to December 2020: A summary of research into how the coronavirus (COVID-19) pandemic has affected students in higher education in England during the autumn term of 2020. London: ONS.	Survey	Strong
			Pearson and Wonkhe (2021) <i>Students' experiences of study during COVID-19 and hopes for future learning and teaching February 2021</i> , London: Pearson and Wonkhe: Available at http://www.improvingthestudentexperience.com/library/covid19/Wonkhe-Pearson-expectation-gap-II-Feb-2021.pdf	Survey	Medium (some limitations)
			Scott, P. (2020). The Impact of COVID-19 on Fair Access to Higher Education. Report by the Commissioner for Fair Access. Available at:	Qualitative study	Strong

			http://www.improvingthestudentexperience.com/library/covid19/impact-covid-19-fair-access-higher-education.pdf		
			Sneyd J R and Mathoulin S E; O'Sullivan E P; So V C; Roberts F R; Paul A A; Cortinez L I; Ampofo R S; Miller C J; Balkisson M A;. (2020). Impact of the COVID-19 pandemic on anaesthesia trainees and their training. <i>British Journal of Anaesthesia</i> , 125(4), 450-455.	Qualitative study	Medium (some limitations)
			Watermeyer R, Crick T and Knight C; Goodall J;. (2021). COVID-19 and digital disruption in UK universities: afflictions and affordances of emergency online migration. <i>Higher Education</i> , (81), 623-641.	Survey	Strong
			Wonkhe (2020) Don't Drop Out: Averting a COVID-19 retention crisis. Available at: https://Wonkhe.com	Survey	Strong
			Wonkhe (2020/21). NUS Coronavirus Student Survey Phases 1-111. Available at: https://www.nusconnect.org.uk/resources	Survey	Medium (some limitations)
	1	<ul style="list-style-type: none"> Misuse of Substances 	Evans, S., Alkan, E., Bhangoo, J. K., Tenenbaum, H., & Ng-Knight, T. (2021). Effects of the COVID-19 lockdown on mental health, wellbeing, sleep, and alcohol use in a UK student sample. <i>Psychiatry Research</i> , 298, 113819.	Survey	Strong
	5	<ul style="list-style-type: none"> Support Service Access 	Hewitt, R. (2020). Students' Views on the Impact of Coronavirus on Their Higher Education Experience. HEPI Policy Note 24. Higher Education Policy Institute. Available at: http://www.improvingthestudentexperience.com/library/covid19/HEPI-Policy-Note-27-Students-views-on-the-impact-of-	Survey	Medium (some limitations)

			Coronavirus-on-their-higher-education-experience-in-2020-21-FINAL.pdf		
			Khan Muzammal Ahmad. (2021). COVID-19 and the Learning, Teaching, Assessment, and Personal Experiences of UK-Based International Students During Lockdown. In Thornburg, A. W., Ceglie, R. J., & Abernathy, D. F. (Eds.). <i>Handbook of Research on Lessons Learned From Transitioning to Virtual Classrooms During a Pandemic</i> . IGI Global, 144-166	Survey	Medium (some limitations)**
			Lambrechts, A., & Smith, K. Impact of the COVID-19 Pandemic Crisis on Doctoral Researchers in the UK. Unpublished report, University of York. Available at: https://eprints.whiterose.ac.uk/168633/1/CV19ImpactReport.pdf	Survey	Strong
			Scott, P. (2020). The Impact of COVID-19 on Fair Access to Higher Education. Report by the Commissioner for Fair Access. Available at: http://www.improvingthestudentexperience.com/library/covid19/impact-covid-19-fair-access-higher-education.pdf	Qualitative study	Strong
			Watermeyer R, Crick T and Knight C ; Goodall J ;. (2021). COVID-19 and digital disruption in UK universities: afflictions and	Survey	Strong

			affordances of emergency online migration. Higher Education, (81), 623-641.		
	1	<ul style="list-style-type: none"> • Gender and other social group 	Scott, P. (2020). The Impact of COVID-19 on Fair Access to Higher Education. Report by the Commissioner for Fair Access. Available at: http://www.improvingthestudentexperience.com/library/covid19/impact-covid-19-fair-access-higher-education.pdf	Qualitative study	Strong
	4	<ul style="list-style-type: none"> • Student finances 	Blackbullion (2021). Money and mental health: how financial wellbeing impacts students. A Blackbullion whitepaper, in association with Censuswide. Available at: https://business.blackbullion.com/download/money-and-mental-health-how-financial-wellbeing-impacts-students/?downloaded=yes	Survey	Medium (some limitations)
Farnell T, Skledar Matijević A and Šćukanec Schmidt N;. (2021). The impact of COVID-19 on higher education: a review of emerging evidence (NESNET Report). Publications Office of the European Union. Available at: https://nesetweb.eu/en/resources/library/the-impact-of-covid-19-on-higher-education-a-review-of-emerging-evidence/			Survey	Strong	
Scott, P. (2020). The Impact of COVID-19 on Fair Access to Higher Education. Report by the Commissioner for Fair Access. Available at: http://www.improvingthestudentexperience.com/library/covid19/impact-covid-19-fair-access-higher-education.pdf			Qualitative study	Strong	

			Wonkhe (2020/21). NUS Coronavirus Student Survey Phases 1-111. Available at: https://www.nusconnect.org.uk/resources	Survey	Medium (some limitations)
QUALITY (20)	13	<ul style="list-style-type: none"> • Training of key workers, especially teachers, health professionals 	Bodansky, D., Thornton, L., Sargazi, N., Philpott, M., Davies, R., & Banks, J. (2021). Impact of COVID-19 on UK orthopaedic training. <i>The Bulletin of the Royal College of Surgeons of England</i> , 103(1), 38-42.	Survey	Medium (some limitations)
			Caruana E J, Patel A and Kendall S ; Rathinam S ;. (2020). Impact of coronavirus 2019 (COVID-19) on training and well-being in subspecialty surgery: A national survey of cardiothoracic trainees in the United Kingdom. <i>Journal of Thoracic and Cardiovascular Surgery</i> , 160(4), 980-987.	Survey	Strong
			Choi, B., Jegatheeswaran, L., Minocha, A., Alhilani, M., Nakhoul, M., & Mutengesa, E. (2020). The impact of the COVID-19 pandemic on final year medical students in the United Kingdom: a national survey. <i>BMC medical education</i> , 20(1), 1-11.	Survey	Strong
			Folkard, S. S., Sturch, P., Mahesan, T., & Garnett, S. (2020). Effect of coronavirus disease 2019 on urological surgery services and training up to the peak of the pandemic in South East England. <i>Journal of Clinical Urology</i> , 2051415820970396.	Survey	Medium (some limitations)

			Hussain R, Singh B and Shah N ; Jain S ;. (2020). Impact of COVID-19 on ophthalmic specialist training in the United Kingdom—the trainees’ perspective. <i>Eye</i> (London, England), 34(12) and 2157–2160.	Survey	Medium (some limitations)
			la Velle, L., Newman, S., Montgomery, C., & Hyatt, D. (2020). Initial teacher education in England and the COVID-19 pandemic: challenges and opportunities. <i>Journal of Education for Teaching</i> , 46(4), 596-608.	Qualitative study	Medium (some limitations)
			Longhurst, G. J., Stone, D. M., Duloher, K., Scully, D., Campbell, T., & Smith, C. F. (2020). Strength, weakness, opportunity, threat (SWOT) analysis of the adaptations to anatomical education in the United Kingdom and Republic of Ireland in response to the COVID-19 pandemic. <i>Anatomical sciences education</i> , 13(3), 301-311.	Survey	Strong
			Payne, A., Rahman, R., Bullingham, R., Vamadeva, S., & Alfa-Wali, M. (2021). Redeployment of surgical trainees to intensive care during the COVID-19 pandemic: evaluation of the impact on training and wellbeing. <i>Journal of surgical education</i> , 78(3), 813-819.	Survey	Strong

			Sasitharan, A. (2020). COVID-19: The impacts on foundation training in district general hospitals in the East of England and the East Midlands. <i>Clinical Medicine</i> , 20(6), e253.	Survey	Medium (some limitations)
			Siau, K., Iacucci, M., Dunckley, P., Penman, I., Pawlak, K. M., Kral, J.& Grover, S. C. (2020). The impact of COVID-19 on gastrointestinal endoscopy training in the United Kingdom. <i>Gastroenterology</i> , 159(4), 1582-1585.	Survey	Strong
			Sneyd J R and Mathoulin S E; O'Sullivan E P; So V C; Roberts F R; Paul A A; Cortinez L I; Ampofo R S; Miller C J; Balkisson M A;. (2020). Impact of the COVID-19 pandemic on anaesthesia trainees and their training. <i>British Journal of Anaesthesia</i> , 125(4), pp.450-455	Qualitative study	Medium (some limitations)
			Veerasuri, S., Vekeria, M., Davies, S. E., Graham, R., & Rodrigues, J. C. L. (2020). Impact of COVID-19 on UK radiology training: a questionnaire study. <i>Clinical radiology</i> , 75(11), 877-e7.	Survey	Medium (some limitations)
			Wolf, K., Harrison, D., & McManus, C. (2021). The attitudes, perceptions and experiences of medical school applicants following the closure of schools and cancellation of public examinations in 2020 due to the COVID-19 pandemic: a cross-sectional questionnaire study of UK medical applicants. <i>BMJ open</i> , 11(3), e044753.	Survey	Strong

	6	<ul style="list-style-type: none"> Graduate skills 	<p>Bacon, K. L., & Peacock, J. (2021). Sudden challenges in teaching ecology and aligned disciplines during a global pandemic: Reflections on the rapid move online and perspectives on moving forward. <i>Ecology and Evolution</i>, 11(8), 3551-3558.</p>	Survey	Medium (some limitations)
			<p>Khan Muzammal Ahmad. (2021). COVID-19 and the Learning, Teaching, Assessment, and Personal Experiences of UK-Based International Students During Lockdown. In Thornburg, A. W., Ceglie, R. J., & Abernathy, D. F. (Eds.). <i>Handbook of Research on Lessons Learned From Transitioning to Virtual Classrooms During a Pandemic</i>. IGI Global, 144-166</p>	Survey	Medium (some limitations)**
			<p>Lambrechts, A., & Smith, K. Impact of the COVID-19 Pandemic Crisis on Doctoral Researchers in the UK. Unpublished report, University of York. Available at: https://eprints.whiterose.ac.uk/168633/1/CV19ImpactReport.pdf</p>	Survey	Medium (some limitations)
			<p>Longhurst, G. J., Stone, D. M., Duloher, K., Scully, D., Campbell, T., & Smith, C. F. (2020). Strength, weakness, opportunity, threat (SWOT) analysis of the adaptations to anatomical education in the United Kingdom and Republic of Ireland in response to the COVID-19 pandemic. <i>Anatomical sciences education</i>, 13(3), 301-311.</p>	Survey	Strong

			Piyatamrong, T., Derrick, J., & Nyamapfene, A. (2021). Technology-Mediated Higher Education Provision during the COVID-19 Pandemic: A Qualitative Assessment of Engineering Student Experiences and Sentiments. <i>Journal of Engineering Education Transformations</i> , 34(S), 290-297.	Qualitative study	Medium (some limitations)
			Turner, K. L., Hughes, M., & Presland, K. (2020). Learning loss, a potential challenge for transition to undergraduate study following COVID19 school disruption. <i>Journal of Chemical Education</i> , 97(9), 3346-3352.	Survey	Medium (some limitations)
	2	<ul style="list-style-type: none"> • Loss of funding 	Banerjee, A., Katsoulis, M., Lai, A. G., Pasea, L., Treibel, T. A., Manisty, C. & Moon, J. C. (2020). Clinical academic research in the time of Corona: A simulation study in England and a call for action. <i>Plos one</i> , 15(8), e0237298.	Secondary data analysis	Strong
			Farnell T, Skledar Matijević A and Šćukanec Schmidt N;. (2021). The impact of COVID-19 on higher education: a review of emerging evidence (NESNET Report). Publications Office of the European Union. Available at: https://nesetweb.eu/en/resources/library/the-impact-of-covid-19-on-higher-education-a-review-of-emerging-evidence/	Systematic review	Strong

OUTCOMES (16)	15	<ul style="list-style-type: none"> • Learning loss / Educational Knock-on Effect 	<p>Bacon, K. L., & Peacock, J. (2021). Sudden challenges in teaching ecology and aligned disciplines during a global pandemic: Reflections on the rapid move online and perspectives on moving forward. <i>Ecology and Evolution</i>, 11(8), 3551-3558.</p>	Survey	Medium (some limitations)
			<p>Banerjee, A., Katsoulis, M., Lai, A. G., Pasea, L., Treibel, T. A., Manisty, C., & Moon, J. C. (2020). Clinical academic research in the time of Corona: A simulation study in England and a call for action. <i>Plos one</i>, 15(8), e0237298.</p>	Secondary data analysis	Strong
			<p>Caruana E J, Patel A and Kendall S ; Rathinam S ;. (2020). Impact of coronavirus 2019 (COVID-19) on training and well-being in subspecialty surgery: A national survey of cardiothoracic trainees in the United Kingdom. <i>Journal of Thoracic and Cardiovascular Surgery</i>, 160(4), 980-987.</p>	Survey	Strong
			<p>Choi, B., Jegatheeswaran, L., Minocha, A., Alhilani, M., Nakhoul, M., & Mutengesa, E. (2020). The impact of the COVID-19 pandemic on final year medical students in the United Kingdom: a national survey. <i>BMC medical education</i>, 20(1), 1-11.</p>	Survey	Strong
			<p>Farnell T, Skledar Matijević A and Šćukanec Schmidt N;. (2021). The impact of COVID-19 on higher education: a review of emerging evidence (NESNET Report). Publications Office of the European Union. Available at:</p>	Systematic review	Strong

			https://nesetweb.eu/en/resources/library/the-impact-of-covid-19-on-higher-education-a-review-of-emerging-evidence/		
			Khan, M. A. (2021). COVID-19 and the Learning, Teaching, Assessment, and Personal Experiences of UK-Based International Students During Lockdown. In Thornburg, A. W., Ceglie, R. J., & Abernathy, D. F. (Eds.). <i>Handbook of Research on Lessons Learned From Transitioning to Virtual Classrooms During a Pandemic</i> . IGI Global, 144-166	Survey	Medium (some limitations)**
			Lambrechts, A., & Smith, K (2020) Impact of the COVID-19 Pandemic Crisis on Doctoral Researchers in the UK. Unpublished report, University of York. Available at: https://eprints.whiterose.ac.uk/168633/1/CV19ImpactReport.pdf	Survey	Medium (some limitations)
			la Velle, L., Newman, S., Montgomery, C., & Hyatt, D. (2020). Initial teacher education in England and the COVID-19 pandemic: challenges and opportunities. <i>Journal of Education for Teaching</i> , 46(4), 596-608.	Qualitative study	Medium (some limitations)
			Pearson and Wonkhe (2021) Students' experiences of study during COVID-19 and hopes for future learning and teaching February 2021, London: Pearson and Wonkhe: Available at http://www.improvingthestudentexperience.com/library/covid19/Wonkhe-Pearson-expectation-gap-II-Feb-2021.pdf	Survey	Medium (some limitations)

			Sneyd J R and Mathoulin S E; O'Sullivan E P; So V C; Roberts F R; Paul A A; Cortinez L I; Ampofo R S; Miller C J; Balkisson M A;. (2020). Impact of the COVID-19 pandemic on anaesthesia trainees and their training. <i>British Journal of Anaesthesia</i> , 125(4), 450-455.	Qualitative study	Medium (some limitations)
			Turner, K. L., Hughes, M., & Presland, K. (2020). Learning loss, a potential challenge for transition to undergraduate study following COVID19 school disruption. <i>Journal of Chemical Education</i> , 97(9), 3346-3352.	Survey	Medium (some limitations)
			Veerasuri, S., Vekeria, M., Davies, S. E., Graham, R., & Rodrigues, J. C. L. (2020). Impact of COVID-19 on UK radiology training: a questionnaire study. <i>Clinical radiology</i> , 75(11), 877-e7.	Survey	Medium (some limitations)
			Watermeyer R, Crick T and Knight C ; Goodall J ;. (2021). COVID-19 and digital disruption in UK universities: afflictions and affordances of emergency online migration. <i>Higher Education</i> , (81), 623-641.	Survey	Strong
			Wonkhe (2020) Don't Drop Out: Averting a COVID-19retention crisis. Available at: https://Wonkhe.com	Survey	Strong
			Worth, J & Faulkner- Ellis, H (2021). <i>Teacher Labour Market in England Annual Report 2021</i> . NFER. Available at:	Secondary data analysis	Strong

			https://www.nfer.ac.uk/teacher-labour-market-in-england-2021/		
	1	<ul style="list-style-type: none"> • Immediate Earning Capacity Changes [for children? Those entering the work force?] 	Wonkhe (2020/21). NUS Coronavirus Student Survey Phases 1-111. Available at: https://www.nusconnect.org.uk/resources	Survey	Medium (some limitations)
	1	<ul style="list-style-type: none"> • Widening of gender & other social group imbalances (long term harm) 	Woolf, K., Harrison, D., & McManus, C. (2021). The attitudes, perceptions and experiences of medical school applicants following the closure of schools and cancellation of public examinations in 2020 due to the COVID-19 pandemic: a cross-sectional questionnaire study of UK medical applicants. <i>BMJ open</i> , 11(3), e044753.	Survey	Strong
	3	<ul style="list-style-type: none"> • Knowledge production/research capacity 	Banerjee, A., Katsoulis, M., Lai, A. G., Pasea, L., Treibel, T. A., Manisty, C., & Moon, J. C. (2020). Clinical academic research in the time of Corona: A simulation study in England and a call for action. <i>Plos one</i> , 15(8), e0237298.	Secondary data analysis	Strong
			Lambrechts, A., & Smith, K. Impact of the COVID-19 Pandemic Crisis on Doctoral Researchers in the UK. Unpublished report, University of York. Available at: https://eprints.whiterose.ac.uk/168633/1/CV19ImpactReport.pdf	Survey	Strong

			Watermeyer R, Crick T and Knight C ; Goodall J ;. (2021). COVID-19 and digital disruption in UK universities: afflictions and affordances of emergency online migration. Higher Education, (81), 623-641.	Survey	Strong
CONNECTIONS (4)	3	<ul style="list-style-type: none"> Ongoing professional development of key workers, especially teachers 	Farnell, T., Skledar Matijević, A., Šćukanec Schmidt, N. (2021). 'The impact of COVID-19 on higher education: a review of emerging evidence', NESET report, Luxembourg: Publications Office of the European Union.	Systematic review	Strong
			Payne, A., Rahman, R., Bullingham, R., Vamadeva, S., & Alfa-Wali, M. (2021). Redeployment of surgical trainees to intensive care during the COVID-19 pandemic: evaluation of the impact on training and wellbeing. Journal of surgical education, 78(3), 813-819.	Survey	Strong
			Sasitharan, A. (2020). COVID-19: The impacts on foundation training in district general hospitals in the East of England and the East Midlands. Clinical Medicine, 20(6), e253	Survey	Medium (some limitations)

	1	<ul style="list-style-type: none"> • Other connections (public good) 	Farnell, T., Skledar Matijević, A., Šćukanec Schmidt, N. (2021). 'The impact of COVID-19 on higher education: a review of emerging evidence', NESET report, Luxembourg: Publications Office of the European Union.	Systematic review	Strong

* n > 38 as some studies showed evidence or more than one harm

** Unable to do full analysis as online version unavailable

APPENDIX 6: REFERENCES TO INCLUDED STUDIES ON HARMS

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APPENDIX 7: REFERENCES TO EVIDENCE ON MITIGATIONS

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APPENDIX 8: SYSTEMATIC REVIEWS OF MITIGATIONS BY HARMS BY QUALITY ASSURANCE CATEGORIES

Study of mitigations	Did the review address a clearly focused question?	Overview QA assessment of the review (QA grading for the review (high (H), medum (m), low (l
Harm: Access to higher education – disruptions to school leaving examinations			
Rasooli, A., Zandi, H., & DeLuca, C. (2018)	N/a	Moderately relevant to this review as the settings are “classroom” assessments for all students. Appropriate systematic review methods used. systematic map of concepts in literature, so no QA of included studies or findings or if studies’ quality or design affects review findings. Some of the included studies are quite old, and classroom assessment methods and policies may have been superseded. Broad inclusion criteria for studies from a wide range of countries and study designs and number of studies in each theme.	M
Harm: Access to higher education - Disruption to widening participation processes			
Younger, Gascoine, Menzies and Togerson (2019)	Y	Highly relevant systematic review of experimental and quasi experimental studies for HE. High quality systematic review. Appropriate methods used. Considers quality of included studies and impacts on review findings.	H
Robinson and Salvestrini (2020)	Y	Moderately relevant to the review question on widening access, but earlier on in the pipeline in secondary and post 16,. Described as a literature review, and briefly a rapid review, rather than a systematic review. Search sources limited to Google and Google scholar, which may not be transparent and replicable. First screening limited to title only, so very likely to have excluded some relevant studies at first sift. Includes a range of study designs. Described empirical as limited to “positive results”. No QA of included studies or body of literature overall.	M

Webb, Wyness and Cotton, 2017	No	Highly relevant populations and settings to this review. Non systematic. Literature may have bias in study selection ie limited to those studies showing “demonstrable impact”. Arguably, those not showing impact may have an important contribution to understanding an overall effect. The aim was to present a “broadly representative” collection of literature for the outcomes of interest suggesting a possible bias in study selection and in reporting outcomes, positive and negative. Data range 2008 – 2017, so could be outdated in policy and practice contexts. Much of the literature was form the US)	M
Herbaut and Given, 2019	Y	Highly relevant to this review. High quality systematic review. Broader than financial aid, includes outreach interventions. Appropriate synthesis methods given the diversity of literature. Although one notes authors use raw unstandardized mean differences. rather than calculating effects sizes. Seems likely there would still be variation between the studies due to study designs and differences in delivery even if the outcomes being compared were the same and a meta analysis of effects sizes and a random effects weighting would still be appropriate. Using different methods to calculate effects sizes with different information available is not unusual . Includes high quality studies for causal estimates of impacts.	H
Heaslip, Hutchings et al (2020)	Y	Highly relevant to this review, focusing on the UK context. Wide search strategy, although limiters can sometimes not work as expected, search terms for individual UK nations would have been helpful as would some disadvantaged groups (traveller, first generation, recent migrant etc) Otherwise appropriate methods used. QA of included studies and their impact.	H
Harm: Participation in higher education – Reduction in mental health & wellbeing (includes reduced access to services)			

Ellard, O. B., Dennison, C., & Tuomainen, H. (2021).	To some extent	Highly Relevant population group (University students) moderate relevance to UK context as most included studies are from the US, mixed methods systematic review. High quality review. Limited data extraction on qualitative studies. Not clear what kinds of study designs these were. Limited in synthesis as qualitative and quantitative studies treated the same	H
Freidrich and Schlarb, 2017	Y	Highly relevant to this review setting and population. High quality review of 27 RCT and quasi experimental studies. CBT showed largest effects . High quality review methods using Cochrane review methodology.	H
Worsley, Pennington and Concoran, 2020	Y	Population includes partly relevant population in that it spans both FE and HE students. Review of reviews, has a broad inclusion criteria for reviews and adapted AMSTAR for QA. Appropriate methods used.	H
Kunzler, Helmrich et al, 2020	Y	Highly relevant population (health care students). High quality review of 30 RCTs. Review finds low certainty in included studies. Short and long terms outcomes examined.	H
Montagni et al, 2020	Partly	Highly relevant population and setting. Highly relevant intervention in digital tools. Appropriate methods used for a narrative synthesis given the broad inclusion criteria. Limiting to peer reviewed studies is no guarantee of reliability. Appropriate methods and QA used.	H
White, Foster et al, 2020	Y	Moderately relevant in that it includes relevant populations in adults, but university students are not the main focus of the review. Review includes interventions not otherwise covered. High quality execution, appropriate methods of synthesis	M
Harm: Participation in higher education – Reduced wellbeing of students and staff with pedagogic effects			

Sikstrom et al, 2019	Y	Limited relevance as this is a scoping review, so no QA or findings. Methods appropriate for a scoping review.	M
Harrod, Goss et al, 2014	Y	Relevant settings and population although overlapping with FE as all post secondary populations included. High quality, Cochrane review. Appropriate methods and synthesis	H
Worsely, Pennington and Concoran (2020)	Y	Population includes partly relevant population in that it spans both FE and HE students. Review of reviews, has a broad inclusion criteria for reviews and adapted AMSTAR for QA. Appropriate methods used.	H
Harm: Participation in higher education – Increase in sexual harassment and gender based violence			
Noble, Ward and French, 2017	No	Possibly limited relevance given the setting is in reducing gender based violence in humanitarian settings. Included studies range from 1994 – 2015 so may be dated. Very few studies found that met the inclusion criteria to draw firm conclusions. Appropriate systematic review methods used	L
Yount, Krause and Miedema, 2017	Partly	Limited relevance as the settings are for reducing gender based violence interventions in low income countries. Very wide range of interventions included, Most studies found were about child marriage (13), followed by intimate partner violence (8). Appropriate methods used.	L
Sammut, D., Kuruppu, J., Hegarty, K., & Bradbury-Jones, C. (2021)	x	Highly relevant to HE populations of healthcare students, but in the delivery of programmes, rather than mitigating the harms experienced by students. Appropriate methods of review and synthesis used.	M
Haberland (2015)	x	Moderately relevant to this review as study looks at curricula interventions regarding sexuality and HIV not only in	M

		higher education. High quality systematic review	
Harm: Participation in higher education – Reduction in students’ financial resources			
Nguyen, Kramer and Evans, 2019	y	Moderately relevant as applicable to all post secondary students so overlapping populations for FE, but mainly talks about degree attainment and the largest majority from US universities. High quality systematic review and meta-analysis with cost benefit analysis.	H
Webb, Wyness and Cotton, 2017	No	Highly relevant populations and settings to this review. Non-systematic literature may have bias in study selection ie limited to those studies showing “demonstrable impact” arguably, those not showing impact may have an important contribution to understanding an overall effect. Review has a broad inclusion criterion of any kind of study No formal; QA of included studies or impacts of quality on reliability of findings. Authors recognise limitations to the UK context (much of the literature was form the US)	M
Herbaut and Geven, 2019	Y	Highly relevant to this review. High quality systematic review. Broader than financial aid, includes outreach interventions. Appropriate synthesis methods given the diversity of literature. Although one notes authors use raw unstandardized mean differences. rather than calculating effects sizes. Seems likely there would still be variation between the studies due to study designs and differences in delivery even if the outcomes being compared were the same and a meta-analysis of effects sizes and a random effects weighting would still be appropriate. Using different methods to calculate effects sizes with different information available is not unusual. Includes high quality studies for causal estimates of impacts.	H
Harm: Quality of higher education – Online learning, distorted curricula, rapid pivots in pedagogical approach or assessment processes and reduced training for key professional			

Bengtsson (2019)	Y	Relevant review topic (take-home exams for tertiary education), but systematic review methods mixed quality. Good searches, but unclear QA of the included studies which were of various designs and findings not tempered by quality of the included studies.	M
Vaona et al (2018)	Partly	Relevant review topic (e-learning for health professionals). Cochrane review but serious concerns about the methodology have been raised by Cochrane reviewers and don't appear to have been addressed in an updated version although the authors have responded to the issues mentioned. These include not considering all available studies and issues with meta-analytic methods.	L
Martin, F., Sun, T., & Westine, C. D. (2020).	Partly	Limited relevance - focus is on research themes in online learning between 2009 and 2018; adequate review methods.	M
Dyment and Downing (2018)	Partly	Relevant review topic (online teacher training) but focus is on trends in research not outcomes - eg for trainees; adequate review methods.	M
Webb, Wyness and Cotton (2017)	No	Relevant review topic (key student outcomes in access, retention, attainment, and progression 2009-2016); adequate review methods although took a subset of what was available based on ease of accessing the papers due to large numbers of citations returned by searches; comprehensive findings but not linked to quality assessment of the included studies which are international in source.	M
Miller (2016)	No	Relevant review topic (ethnicity attainment gap defined as difference between White UK students and BME UK students in 1 st or 2:1 degrees); not a systematic review but a report drawing in data and findings from systematic reviews and other research (no information on how these were sourced) - focus is on UK data.	L

Education Endowment Foundation (2020)	Y	Relevant topic (remote and blended professional development for teachers); rapid evidence review of meta-analyses and systematic reviews; high quality review methods; evidence linked to quality.	H
Moore – Adams, Jones and Cohen (2016)	Y	Relevant review topic (preparing K12 teachers to teach online with focus on the types of knowledge and skills required); adequate review methods; findings linked to quality of the available studies.	H
Bragg, Walsh and Heyeres (2021)	Y	Relevant review topic (online professional development for K12 teachers with focus on outcomes and design elements of professional development programs); good review methods; 11 US studies, 1 Philippines; reliable review with high relevance.	H
Ko and Petty,	Partly	Moderately relevant population as review spans both FE and HE, all post-secondary. Low reliability of findings scoping review, Exclusion of so called “grey literature” does not guarantee academic standards for evidence as stated by authors. language limits and date limits were more justifiable. Limited relevance to mitigations as scoping review and mapping of literature so no QA or findings of effectiveness.	M
Ashcroft, Byrne, Brennan and Davies, 2021	Y	Highly relevant population. Review outcomes measure disaster and disease preparedness, so mitigations of harms resulting from a lack of preparedness. Rapid publication demands meant no protocol and research strategy published in advance. Review found studies that measured clinical outcomes, though this was in scope. Limited reliability and quality studies included. Limited reliability given lack of clinical outcomes on recommendations or training.	M
Shamsir, Krauss et al	Partly	Highly relevant settings and population. Relevant to the COVID19 context, but less known relevance to the UK experience of harms or COVID19. Scoping review, ie mapping of features of published	L

		literature, so no QA or assessment of reliability of findings. Searches limited to Google and Google scholar, while extensive in coverage, the prioritisation of results tailored to the searcher's histories is neither transparent nor replicable.	
Harm: Outcome of higher education – Reduction in graduate skill, or capacities and availability for key professions (health & teach			
Beaglehole, Mulder et al (2018)	Y	No relevance. Mitigations focus is on harms following natural disasters of which it is a rigorous review.	L
Russo, Silva et al (2021)	x	Can't get article	
Rayes and, Meiqari, 2021	partly	Possible limited relevance as review is on polices. The focus of review is enhancing healthcare workers capacity following conflict. Their findings are limited because a lack of evidence was found. Methods appropriate for data used.	L
Howell , Unterhalter & Oketch (2020)	Y	Moderate relevance focus is on evidence of role of tertiary evidence in low and lower middle income. Its findings could be applied to enhance capacity in education. SR methods appropriate although did not formally evaluate quality.	M
Torani et al (2019)	limited	Limited relevance focus as is in disaster training for vulnerable groups not specific to HE. Learning may be gained from how to design education programs for those facing disasters but evidence is based on studies of limited design. SR methods appropriate, although some details including the type of studies designs of some of the studies included	M
Chappel and Richards' (2015)	x	Moderately relevant in that its focus is on 'fast-tracking' newly trained staff (nurses) to acquire leadership skills. SR methods appropriate, although lacks details in inclusion criteria. Limited though as studies reviewed tested Interventions without prospective control and issue if generalisability to other professionals' groups	L
Harm: Disruptions of the connection of higher education with communities – civic relations, equality and diversity			

Seo et al's (2021)	Partly	Moderately relevant its focus is on disruption to community at large in regards to educating for disaster safety. Methods used appropriate but lacks QA and evidence found is limited in regards to mitigations	M
Howell , Unterhalter & Oketch (2020)		Highly relevant given the focuses is on equality and civic relations in tertiary education. Whilst the focus in review is in development in lower to middle low countries, learning could be applied to situations of disruption. Appropriate methods used but lacks formal quality assessment.	M

APPENDIX 9: REFERENCES OF DISASTER LITERATURE CONSULTED

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International Public Policy Observatory (IPPO)

IPPO is an ESRC funded initiative to provide decision-makers in government at all levels with access to the best available global evidence on the social impacts of the COVID-19 pandemic, and the effectiveness of policy responses. IPPO is a collaboration between the Department of Science, Technology, Engineering and Public Policy (STePP) and the EPPI Centre at UCL; Cardiff University; Queen's University Belfast; the University of Auckland and the University of Oxford, together with think tanks including the International Network for Government Science (INGSA) and academic news publisher The Conversation.

EPPI Centre

Founded in 1996, the EPPI Centre is a specialist centre in the UCL Social Research Institute. It develops methods: (i) for the systematic reviewing and synthesis of research evidence; and (ii) for the study of the use research. As well as being directly involved in the academic study and the practice of research synthesis and research use, the centre provides accredited and short course training programmes in research synthesis and social policy and research.

UCL Social Research Institute (SRI)

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First produced in 2021 by:

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<https://www.ucl.ac.uk/ioe/departments-and-centres/departments/ucl-social-research-institute>

Twitter: @UCLSocRes

ISBN: 978-1-911605-24-9

Design and editorial support by: Lionel Openshaw

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