Vol.3 No.2 (2020)

Journal of Applied Learning & Teaching

ISSN : **2591-801X**

Content Available at : **http://journals.sfu.ca/jalt/index.php/jalt/index**

COVID-19 in Higher Education Literature Database (CHELD V1): An open access systematic literature review database with coding rules

Kerryn Butler-Henderson[A] *A* *Associate Professor, College of Health and Medicine, University of Tasmania, Australia*

Joseph Crawford[B] *B* *Academic Division, University of Tasmania, Australia*

Jürgen Rudolph[C] *C* *Head of Research & Senior Lecturer, Kaplan Higher Education, Singapore*

Karima Lalani[D] *D* *Consultant, Baylor College of Medicine, U.S.*

Sabu K. M.[E] *E* *Associate Dean, Manipal College of Health Professions (MCHP); Professor, Department of Health Information Management, MCHP*

Keywords

College;
coronavirus;
higher education;
open access database;
pandemic;
systematic review;
university.

Article Info

Received 20 August 2020
Received in revised form 28 August 2020
Accepted 28 August 2020
Available online 28 August 2020

DOI: https://doi.org/10.37074/jalt.2020.3.2.11
DOI: https://doi.org/10.37074/jalt.2020.3.2.11d

Abstract

The novel coronavirus (COVID-19) pandemic has affected every sector across every corner of the world. The higher education sector is not immune from the pandemic and is facing significant learning and teaching challenges. The existing literature databases on COVID-19 are focused on the medical elements of the pandemic. This manuscript documents the method for the creation of the first version of the COVID-19 in Higher Education Literature Database (CHELD). Our aspiration is to provide an open access resource to support future learning and teaching scholars to gain timely access to pre-examined literature on higher education during COVID-19. This first version documents 138 manuscripts published or online-first between 1 January 2020 to 30 June 2020. Using a rigorous systematic review method, engaging in the PRISMA approach, quality assessment using the Mixed Method Appraisal Tool (MMAT) and Quality Assessment Tool for Theory and Literature (QATTL), we offer a first glance at the metadata of articles published on COVID-19 in higher education during the first six months of 2020. By providing an open access database, we see the opportunities for future research as boundless.

Introduction

The first six months since the first novel coronavirus (COVID-19) case appeared in Wuhan, China, have had profound and continuing implications on the global higher education sector. Early characterisations of the 'intra-period' response have been of rapid adaptation and digitalisation (Crawford et al., 2020a). The curriculum of higher education institutions from every corner have been radically revised to suit remote, distance, online, and digital forms of delivery (e.g. Murphy, 2020). COVID-19 has had a strong and rapid influence on global Higher Education, leading in many countries around the world to the cessation of face-to-face classes and 'emergency remote teaching' and changes in assessment, as well as learning and teaching approaches and strategies (Bonk et al., 2020).

There has been a plethora of publications from biological, medical and related sciences (often pre-published in BioRxiv or MedRxiv), covering "everything from the genetics of the virus that causes the disease to computer models of its spread and the scope for vaccines and treatments" (*The Economist*, 2020c, n.p.). Some journals in the aforementioned disciplines have started to fast-track the peer-review process to accelerate the publication process (*The Economist*, 2020a). Other journals have lowered their paywalls to make research about SARS-CoV-2 more widely available (*The Economist*, 2020a). There has been an exponential increase in global research efforts to understand and control the virus (*The Economist*, 2020b). While under normal circumstances, publishing in scientific journals usually takes years, speed has become paramount and journals "have squeezed their normal processes down to days or weeks" (*The Economist*, 2020b, n.p.), thus providing physicians, policymakers, and heads of state with the latest science in order to make far-reaching decisions (*The Economist*, 2020b).

Publications on COVID-19 in relation to higher education, however, still tend to be fragmented and oftentimes microscopic, focusing on single universities and short temporal experiences during the pandemic. This observation of a relative dearth of systematic and macro-level research led our international team (based in Australia, India, Singapore and USA) to the exploration of creating a database that shares the research on higher education openly. Dating the outbreak at approximately the end of 2019, we asked the following research question:

> *Research question: Can we curate the first six months of published literature to support future researchers?*

The database that is the centrepiece of our article is the result of hundreds of research hours. For the publication, we chose an open-access journal that would be able to share the database with researchers worldwide in a no-frills way and without academic paywalls. This being a topic of grave importance, and in the spirit of knowledge-sharing, we are making the database (and of course this article, too) openly available, but ask you to cite it should you make use of it in your own work.

The literature on how individuals, institutions, and countries are responding to the challenge of COVID-19 abound; higher education literature is no exception. Higher education studies have emphasised how students and staff are responding to rapid adaptation, how institutions are managing their new commitments and new service landscape, and how institutional responses differ. These early studies, while offering unique insights to specific responses, are often poorly contextualised in the broader literature. There are a number of studies that report the same, or similar, findings with little knowledge-sharing between these.

It is understandable that, at the early stage, it is critical to rapidly share findings to enable educators and practitioners timely access to new insights. Each new study can provide novel insights, and particularly, possible opportunities to learn from mistakes of some institutions or from successes of others. This manuscript seeks to support the continued rapid-sharing of information with a timely systematic literature review of the current higher education literature. Our research objective is to examine, with rigour, the current literature and provide a curation of the literature on higher education during COVID-19. In this endeavour, we attach access to an open access and filter-able database to support scholars to examine specific areas of research (e.g. discipline-specific or country-specific research), or for practitioners/ educators seeking to understand the evidence that relates to their specific context.

This manuscript is a method paper that describes the study protocol for the development of the COVID-19 in Higher Education Literature Database (CHELD) V1.0. We focus next on defining specific elements within the database to enable our own reflexivity. It also provides scholars transferability from our context and assumptions, to their own. For example, defining paper type provides clarity of the coding rules we used. We continue to define the method for the creation of this database, and reporting on the systematic literature review process. We follow the coding rules with practical implications, future research suggestions, limitations, and formal conclusions.

Material and methods

As the database is a collection of published articles, a systematic approach was used to source the articles to capture all available articles.

Title selection procedure

A comprehensive search strategy (Figure 1) was employed using several methods of data collection to capture as many articles published between 1 January and 30 June 2020, including those published online first, that relate to the topic of COVID-19 and teaching and learning in higher education. In each method, the following search string was used for title and abstract searches:

> *[higher education OR university OR college] AND [COVID OR coronavirus]*

First, the following databases were searched, and relevant titles extracted into an Endnote library: Academic Search Ultimate, EBSCO, IEEE Xplore, Informit Online, Ovid, Proquest, ScienceDirect, Scopus, and Web of Science. Second, the search string was used in Google Scholar, with all titles saved to the Google Scholar library and then extracted into the EndNote library. Third, using the list of journals within the journal rankings subject category "Education" in Scimago (SJR) (n.d.), the first 100 journals (Appendix 1) that included the term "educat*" or "learn" or "teach" or "academic" in the title was searched for any articles published or online first, and these titles manually entered into the Endnote library. Fourth, all 2020 issues of any journal that published at least three papers selected through the first two methods, were reviewed and any relevant titles were manually entered into the Endnote library.

The eligibility criteria for inclusion are as follows. Articles that related to teaching, curriculum, education, and students, including wellbeing and impact, in higher education were included in the search strategy. Excluded articles included those about university administrative processes not related to teaching, medical or science research related to COVID-19, such as vaccine, testing, health outcomes, monitoring, virus strain or biological/health impacts. If the article was about students but not related to teaching or learning, they were also excluded. For example, if the article was examining a non-teaching issue using students as the population, such as non-curriculum information seeking behaviour, that article was excluded. Post (after) graduation education was also excluded, including residency or intern medical education or training for health care workers. Lastly, articles that were editorials, news items or non-peer reviewed pieces were excluded.

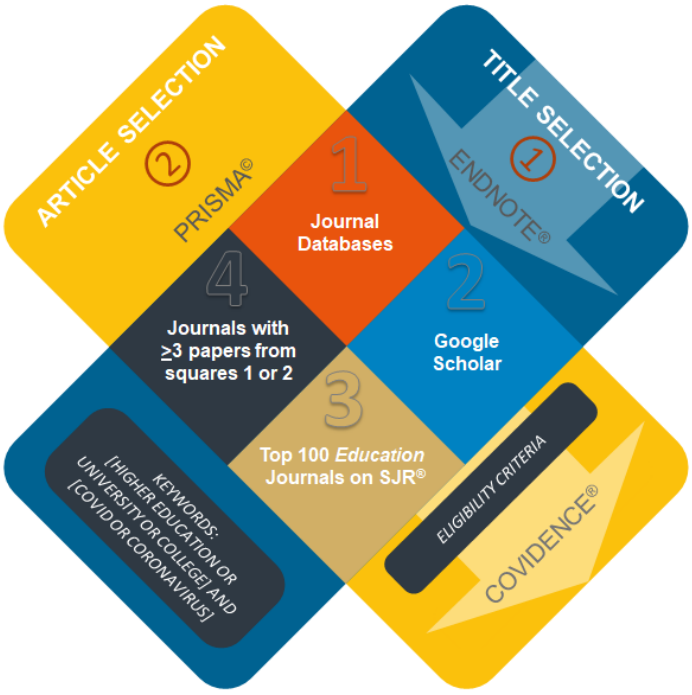

Figure 1: Article selection process

Article selection procedure

Next, all records in Endnote were extracted and imported into the Covidence® online software. Covidence facilitates the application of the PRISMA approach for article selection (Moher et al., 2009). Each of the 3,945 titles and abstracts were double-screened by two of the authors using the eligibility criteria, with the whole team meeting to discuss and reach consensus where there was disagreement. A large volume of papers were related to biology or medicine, yet, were picked up because a university or university hospital was involved. As such, the number of articles that progressed to the full-text selection stage was greatly reduced, as shown in Figure 2. During this stage, the full-text of each article was double-reviewed and again discordance managed through a team consensus discussion. The papers selected through this process were accepted for the database.

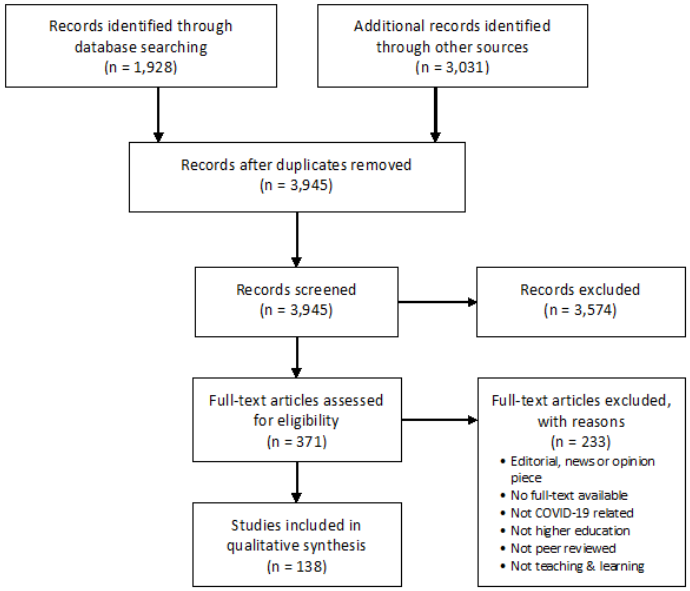

Figure 2: PRISMA article selection flowchart

Theoretical framework: Coding rules

In creating the following database, a series of theoretical assumptions were applied to the final presentation of the database. These are enumerated in Table 1. The aim of presenting the underlying assumptions was to enable our reflexivity as researchers and provide other researchers an opportunity to understand how the data can be manipulated within their own jurisdiction, institution, discipline, or context.

While many of the elements within the data are already transparent, and likely to be simply applied to future research contexts (e.g. DOI, journal metadata, and country), some require specific justification: Quality tool, quality assessment score, discipline, pandemic stage, type of study, and participant type. Each of these will be defined in more depth in the following sections.

Table 1. Description of data elements

Data element	Field type	Description
Year of publication	Numeric	The year of the manuscript publication
Month of publication	Numeric	The month of the manuscript publication
First author last name	Alphabetic	Last name of first author of the study
Quality tool	Alphabetic	Type of quality tool used (QATTL, MMAT)
Quality assessment score (QAS)	Numeric	Score derived from quality tool used for the study
Country	Alphabetic	Country of origin of the study. For theoretical papers this is the country of the authors.
State/Province	Alphabetic	State or Province of the country, if applicable
Pandemic stage	Alphabetic	The current pandemic stage defined by Crawford (2020, *in press*): rapid adaptation, improvement, consolidation, and restoration
Paper type	Alphabetic	Type of paper/article.
Type of study	Alphabetic	Type of study (Qualitative, Quantitative, Mixed Methods, Theoretical)
Methods Used	Alphabetic	Methods used, if available
Participant Type	Alphabetic	Participant type (academic, student, NA)
Discipline	Alphabetic	Broad higher education discipline groupings
Subdiscipline	Alphabetic	The higher education discipline of the study, if available
Authors	Alphabetic	Names of all authors of study
Title	Alphabetic	Study title
Journal	Alphabetic	Name of journal where study is published
Volume	Numeric	Volume number of journal where study is published
Issue	Numeric	Issue number of journal where study is published
Pages	Numeric	Page numbers in journal where study is published
DOI	URL	Digital Object Identifier of the study

Quality assessment score (QAS)

Firstly, two quality assessment tools were used: the Mixed Method Appraisal Tool (MMAT: Hong et al., 2018) and the Quality Assessment Tool for Theory and Literature (QATTL: Crawford et al., 2020b). We used these two tools to provide a rigorous quality assessment based on two categories of manuscripts: theoretical or empirical. Theoretical manuscripts were assessed using the QATTL, and empirical manuscripts were assessed using the MMAT. Where there were instances of inappropriate questions for the specific manuscript, these were excluded from the score calculation (e.g. a statistical item in the MMAT was not appropriate for a purely qualitative manuscript). After calculating specific percentages, we placed the scores into four categories: poor (0-25%), low (26-50%), medium (51-75%), and high (76-100%). Quality performance is presented below in Table 2.

Table 2. Quality assessment score distributions

Quartile	MMAT (*n* = 56)	QATTL (*n* = 83)
POOR	10.71%	12.05%
LOW	53.57%	42.17%
MEDIUM	19.64%	22.89%
HIGH	16.07%	22.89%

Discipline and sub-discipline

We aim to provide a high-level understanding of the disciplines of reference. The goal is to categorise the subdisciplines in the same way the researchers did -- for example, 'chemistry' or 'journalism'. The discipline category is grouped in four ways at the higher level, based on the subdiscipline definition: health science, humanities and social science, science technology engineering and mathematics, and others. The latter category will allow broad grouping research to occur.

Pandemic phase

Crawford (2020) characterised four phases of pandemic response: rapid adaptation, improvement, consolidation, and restoration. The goal of characterising each manuscript by these categories was to enable a live understanding of how each University and country is progressing from pre-COVID-19 to, and through, the new normal. The goal of the first phase is "to rapidly adapt core business for the new context"; the second phase is "to optimize the adapted core business to improve quality and begin to consider non-core activities"; the third phase is "to evaluate pre-pandemic measures of social, economic, and environmental success"; and, the fourth phase is "to determine what a return to business-as-usual looks like, and how it can occur" (Crawford, 2020, n.p.). It is recognised that institutions will likely go through these stages at different speeds, and some institutions may move fluidly between phases. Likewise, it is possible for an institution to exist inside of two phases, depending on their method of engagement and organisational strategy.

Type of study

The type of study is defined as: theoretical, quantitative, qualitative, or mixed methods (empirical). The method used is defined by the specific title of method presented in the manuscript. If none are described, and there is an obvious inference, we have included a placeholder. If it is not clear, it has been retained as blank.

Participant type

For participants, there are a series of possible options in the current iteration of the database: academic, student, or not available. In the next version of the database, this field will be refined and delineated into additional categories, such as academic, professional or management, undergraduate student, postgraduate student, and doctoral student. We also include three additional options: mixed staff (including two or more categories of staff), mixed students (including two or more categories of students), and mixed staff and students (for samples comprising both students and staff).

Where to next?

This manuscript provides rigorous research foundations for the current peer-reviewed research on COVID-19 in higher education, published between 1 January 2020 and 30 June 2020. For educators, this is an important resource to enable evidence-based understandings of how digital education during COVID-19 is being conducted. It also provides academic managers and leaders to learn from the successes and failings of other institutions to enrich and enable their students' learning experience and quality of life. We encourage those who work with academic institutions, or provide services to such entities, to engage in the high quality literature emerging within their specific context. This database makes the access to timely knowledge easier, with an aim to promote knowledge-sharing behaviours in higher education providers during the pandemic.

The primary limitation to this database creation was the potential for the research team to have missed manuscripts that were not uploaded online yet, despite being published as a hard copy during the inclusion window. We aim to create future versions of this database that include future time periods to pick up on the potential articles missed, and to create a living document to mitigate this limitation.

The database attached to this manuscript provides opportunities for scholars to extract specific components of the published literature for their own studies. This database, and future versions of this database will provide an opportunity for easy access to undertake future research based on a clear and transparent understanding of the database. We encourage scholars to download filtered versions of the database and draw on our systematic efforts in their own research; an appropriate citation to the database is included below and on the database itself.

A note on the importance of open access (OA) publications that have become more popular in recent years, is in order. OA benefits are numerous such as providing all users free, immediate and permanent access without an embargo period. This increases readership and visibility, maximises the impact and efficiency of the whole research process, and avoids inequalities in access - historically, research was hidden behind a paywall (Directory of Open Access Journals, n.d.; Max Planck Society, 2003; Schiltz, 2018; Science Europe, 2013). It is ironic that in non-OA journals, taxpayers do not have access to the research that they have often partially funded. In addition, publication paywalls withhold "a substantial amount of research results from a large fraction of the scientific community" (Schiltz, 2018, n.p.) Schiltz (2018, n.p.) persuasively argues that no science (including the humanities) "should be locked behind paywalls". Consequently, many funding agencies (for instance, the members of cOAlition S) now require funded research to be published as open access (Schiltz, 2018; cOAlition S, 2020).

While there is a vast array of OA options (Chen & Olijhoek, 2016; Olijhoek et al., 2015), it is Diamond OA that does not include a requirement for authors to pay author submission charges, article processing charges (APCs) or any other charges (cOAlition S, 2020; Fuchs & Sandoval, 2013). Importantly, authors retain copyright to their work. The process of scientific discovery builds on prior research and "can only work optimally if all research results are made openly available to the scientific community" (Schiltz, 2018, n. p.). A recent survey on Diamond OA journals implies that the open sharing of research data - that we advocate and practice in this article - is a particularly laudable practice that goes further than the mere open access publication of articles (cOAlition S, 2020). The CHELD goes beyond Diamond OA publishing as it constitutes open data-sharing, thus avoiding other researchers' 'double work' and providing them with a head start in addressing one of the key problems of our time, the COVID-19 pandemic, in the context of Higher Education.

Conclusion

This manuscript reports on the research and development of the COVID-19 in Higher Education Literature Database (CHELD V1). For open access to this database, see https://doi.org/10.37074/jalt.2020.3.2.11d (Butler-Henderson et al., 2020).

A rigorous systematic review method has been adopted to ensure the maximal utility of the information and metadata contained in the database. This began with an extensive search across the literature, databases, and online sources to ensure coverage of publications. We underwent a rigorous double-screening, double full-text review, and single quality-assessment process with transparent documentation to support future researchers. We also curated this list to support existing researchers to connect on their synergies with other scholars. This database is the first of its kind in the higher education literature to curate the existing literature for higher education practitioners and researchers. The consolidation of existing literature into one database will save researchers time in acquiring literature, whilst ensuring subsequent articles were informed by literature sourced from a strong methodological framework. Reducing the burden of sourcing the literature may see an increase in learning and teaching manuscripts examining the various impacts of COVID-19. Promotion of this resource will be critical in supporting COVID-19 scholarship of learning and teaching. Our aim is to update this database with additional time periods and refined coding rules at multiple junctures over the coming years to make this a robust, ongoing resource. This will provide timely access to new insights in learning and teaching as we collectively learn from the successes and failures of the collective higher education sector, and promote rigorous literature review design to advocate scholarship in learning and teaching.

Acknowledgement:

The research assistance of Shannon Tan is acknowledged with gratitude.

References

Bonk, R., Kefalaki, M., Rudolph, J., Diamantidaki, F., Rekar Munro, C., Karanicolas, S., Kontoleon, P., & Pogner, K.

(2020). Pedagogy in the time of pandemic: From localisation to glocalisation. *Journal of Education, Innovation, and Communication, 2*(1), 17-64.

Butler-Henderson, K., Crawford, J., Rudolph, J., Lalani, K. & Sahu, K. M, (2020). COVID-19 in Higher Education Literature Database (CHELD V1). *Institute of Research Innovation*. https://www.instituteofresearchinnovation.com/data/covid-19-and-higher-education-coronavirus. https://doi.org/10.37074/jalt.2020.3.2.11d

Chen, X., & Olijhoek, T. (2016). Measuring the degrees of openness of scholarly journals with the open access spectrum (OAS) evaluation tool. *Serials Review, 42*(2), 108-115.

cOAlition S (2020). *Plan S. Making full and immediate Open Access a reality*. https://www.coalition-s.org/

Crawford, J. (2020). COVID-19 and higher education: A pandemic response model from rapid adaption to consolidation and restoration. *In-press*.

Crawford, J., Butler-Henderson, K. Rudolph, J., Malkawi, B., Glowatz, M., Burton, R., Magni, P., & Lam, S. (2020). COVID-19: 20 countries' higher education intra-period digital pedagogy responses. *Journal of Applied Learning & Teaching, 3*(1) 9-28.

Crawford, J., Butler-Henderson, K., & Kelder, J-A. (2020b). Quality assessment tool for theory and literature (QATTL): Development and validation. *In-press*.

Crawford, J., Percy, A., & Kelder, J-A. (2020c). JUTLP Editorial 17.3: Connection, digital education, and student-centric teaching practice before COVID-19. *Journal of University Teaching & Learning Practice, 17*(3), 1-5.

Directory of Open Access Journals [DOAJ] (n.d.). *Information for publishers.* https://doaj.org/publishers

Ferdig, R., Baumgartner, E., Hartshorne, R., Kaplan-Rakowski, R., & Mouza, C. (2020). *Teaching, technology, and teacher education during the covid-19 pandemic: Stories from the field*. Waynesville, NC, USA: Association for the Advancement of Computing in Education (AACE).

Fuchs, C., & Sandoval, M. (2013). The diamond model of open access publishing: Why policy makers, scholars, universities, libraries, labour unions and the publishing world need to take non-commercial, non-profit open access serious. *TripleC: Communication, capitalism & critique, 11*(2), 428-443.

Hong, Q., Fàbregues, S., Bartlett, G., Boardman, F., Cargo, M., Dagenais, P., Gagnon, M., Griffiths, F., Nicolau, B., O'Cathain, A., & Rousseau, M. (2018). The Mixed Methods Appraisal Tool (MMAT) version 2018 for information professionals and researchers. *Education for Information, 34*(4), 285-291.

Max Planck Society (2003). *Berlin declaration on open access to knowledge in the sciences and humanities*. https://openaccess.mpg.de/Berlin-Declaration

Moher, D., Liberati, A., Tetzlaff, J. & Altman, D. (2009). Preferred reporting items for systematic reviews and meta-analyses: the PRISMA statement. *Annals of internal Medicine, 151*(4), 264-249. https://doi.org/10.7326/0003-4819-151-4-200908180-00135

Murphy, M. (2020). COVID-19 and emergency eLearning: Consequences of the securitization of higher education for post-pandemic pedagogy. *Contemporary Security Policy,* Advanced Online Publication.

Olijhoek, T., Bjørnshauge, L., & Mitchell, D. (2015). Criteria for open access and publishing. *ScienceOpen Research*.

Peters, M., Wang, H., Ogunniran, M., Huang, Y., Green, B., Chunga, J., & Khomera, S. (2020). China's internationalized higher education during Covid-19: Collective student autoethnography. *Postdigital Science and Education*. Advanced Online Publication.

Schiltz, M. (2018). Science without publication paywalls: cOAlition S for the realisation of full and immediate open access. *Frontiers in Neuroscience 12*, 656. https://doi.org/10.3389/fnins.2018.00656

Science Europe (2013). *Science Europe principles on open access to research publications.* http://scieur.org/opennew

SCImago, (n.d.). *SJR — SCImago journal & country rank* [Portal]. http://www.scimagojr.com

The Economist. (2020a, March 20). Coronavirus research is being published at a furious pace. https://www.economist.com/graphic-detail/2020/03/20/coronavirus-research-is-being-published-at-a-furious-pace

The Economist. (2020b, May 7). Scientific research on the coronavirus is being released in a torrent. https://www.economist.com/science-and-technology/2020/05/07/scientific-research-on-the-coronavirus-is-being-released-in-a-torrent

The Economist. (2020c, May 9). Speeding up science during the pandemic. https://www.economist.com/leaders/2020/05/09/speeding-up-science-during-the-pandemic