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Patterns and Dynamics in the International Research Collaborations: A Case of China-UK Collaboration Ties in Education Studies

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Abstract

This study seeks to explore the patterns and dynamics of China-UK research collaborations in education studies over the past two decades. It applies two conceptual frameworks to analyse the structure and power relations in global social sciences, the global-national systems, and the academic dependency theory. An explanatory sequential mixed methods design is implemented. Bibliometric data is collected from Social Science Citation Index (SSCI) and Chinese Social Science Citation Index (CSSCI) from 2001 to 2020 and qualitative data is based on semi-structured interviews with eight China and UK based researchers engaged in collaborative research. Integrating both quantitative and qualitative data, this study has five main findings. First, international research collaborations appear to serve two purposes, as a platform to introduce nationally active researchers into the global system for Chinese researchers, and as a space to integrate social realities and theoretical frameworks based in different contexts for Chinese and UK researchers. Second, the social relations in China-UK collaboration seem to be equal and respectful rather than dominant and dependent. Third, Chinese researchers absorb much knowledge from UK collaborators in theoretical analysis and publication advice but remain autonomous in other aspects of international collaboration activities.

Fourth, the awareness of the exclusion of non-Anglo-American social sciences in global social sciences can motivate researchers to publish to a wider audience and thus facilitate two-way knowledge exchange by overcoming language and platform differences. And fifth, the interpretation of first authorship requires more nuanced understanding of the various ways of assigning rewards and recognition, rather than equating it with leadership and dominance.

Keywords: international research collaboration; teamwork and partnerships; power relations

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1. Introduction

The development of science and technology in China has advanced rapidly since early 2000s. It is partly driven by China's increasing R&D expenditure from 32 billion US dollars in 2000 to 526 billion US dollars in 2019 (US National Science Foundation, 2022). In 2020, China produced the largest number of science publications (23% in world share) and ranked second in the top 1 per cent most-cited publications by 2018 (US National Science Foundation, 2022), indicating a simultaneous growth in global visibility and recognition. Nonetheless, Chinese social sciences do not share similar global prominence as the natural sciences (Li & Yang, 2020; Xu, 2021). The world share of China's SSCI-indexed (Social Science Citation Index) papers was still less than five per cent in 2018 (Zhang, Shang, Huang, & Sivertsen, 2020).

One possible explanation is that social sciences tend to be more nationally embedded than natural sciences and therefore have less international visibility. Natural sciences mainly resort to logical and mathematical deductions to identify universal and deterministic laws about the physical world; it advances towards truth when a new paradigm can better explain the observations and offers a model closer to the objective and external reality (Kuhn, 1970; Von Wright, 1971). Comparatively, social sciences aim to identify theories and insights with delimited conditions and boundaries about some unobservable social phenomena (Archer, Bhaskar, Collier, Lawson, & Norrie, 2013). The boundedness and particularity of social theories lead to the local embeddedness of social sciences, some of which do not appear in the global academic communication (Huang & Gao, 2015).

In face of a relatively low degree of internationalisation of social sciences, Keim (2011) proposed the ideal for a globalised social science field as 'a real debate among equals around the levels of generalisation of social science theory as well as around the epistemological foundations of social science disciplines' (p. 138). The key to achieve this vision is to integrate diverse epistemic routes worldwide and make them visible in an inclusive global system to address human problems (Archer, 1991; Keim, 2011). International research collaboration is one approach to enhance

academic communication among diverse cultural groups and provides opportunities for mutual learning, which is the research focus of this study (Zingerli, 2010; Dusdal & Powell, 2021).

This study mainly focuses on China's international research collaboration in social sciences and uses China-UK education collaboration as a case study. I define 'education research' as the field of study that 'examines education and learning processes and the human attributes, interactions, organizations, and institutions that shape educational outcomes' (AERA, 2021). The UK has been one of the three major social science powers after World War II along with the US and France (Archer, 1991). The UK produced around 10% citations and 15% of world's most highly cited papers with only 4.1% of the world's researchers in social sciences (BEIS, 2017). More recently new funding of £110m is launched by the Department of Business, Energy and Industrial Strategy to establish more international collaborations worldwide (BEIS, 2019).

Compared to UK's established status in world social science, China seems to be a rapidly emerging player. Since 2015 the Belt and Road initiative has promoted more extensive research collaborations with countries in Asia, Europe, and Africa (Van der Wende, Kirby, Liu, & Marginson, 2020). The self-position of China's social research has seen a gradual shift in policy discourse from a learner to a contributor that seeks to introduce and integrate Chinese social realities and values to the world (Ministry of Education, 2011; Xu, 2021). The China-UK research collaboration ties provide a meaningful case to analyse the broad patterns and nuanced social dynamics of collaboration activities from different perspectives. It contributes to more informed policymaking in research assessment and management at national and global levels.

2. Theoretical Framework

The theoretical frameworks help understand the position of China-UK education research in the global and national context. Two lenses are applied: 'the national-global systems' which theorise the structure and organisation of social sciences, and (2) the 'academic dependency theory' that refers to the power struggle between

Euro-American countries and other countries in global academic development. The two theoretical lenses direct the critical review of existing literature.

2.1 The global and national research systems

The conceptualisation of scientific structures helps illuminate the characteristics and management of research activities involved by various players such as policymakers, university administrators, and researchers. One way to understand research activities is through the division of two systems, the global and national systems based on their qualitatively different practices, objectives, and institutional structures (Wagner, Park, & Leydesdorff, 2015; Marginson, 2021). The three aspects are closely linked: research practices are strategies and approaches to actualise the research objectives through the facilitation of institutional resources (Marginson, 2021).

At the global science system, researchers obtain visibility and impact mainly from publishing work in internet-based science platforms, defined largely by journal articles in Web of Science and Scopus (Waltman, 2016). However, Web of Science and Scopus primarily include English-medium journals founded in Anglo-American countries and managed through Anglo-American academic criteria (Jackson & Primecz, 2019). Preferable research topics and methodologies are predominantly determined by Anglo-American academic traditions and standards (Jackson & Primecz, 2019).

For Chinese social scientists to earn the membership of global science system, academics need to overcome language barriers and assessment culture difference. Those who do not appear in the international literature remain mostly in the national system (Marginson & Xu, 2021). The challenges to integrate into the global social science system potentially led to some Chinese social scientists changing how they design, conduct, and disseminate research work, including engaging in international collaborations (Li & Yang, 2020).

Comparatively, the national science systems are managed by government regulations, policies, and funding (Marginson, 2021). The national science systems tend to emphasise the local realities and values in research topics and methodologies (Xie, 2022). This is because social sciences are intrinsically intertwined with local realities and the findings of social research are widely engineered into national social transformation (Heilbron, 2014). However, the fact that global academic community is generally unfamiliar with Chinese language and Chinese cultures prevents the global audience from accessing large volumes of Chinese social sciences, which have challenged the two-way exchange of social knowledge between China and the world (Yang, Xie, & Wen, 2018).

For UK researchers the division between global and national science systems may not seem as clear as for Chinese researchers due to their language advantage and familiarity with mainstream methodologies and academic values (Butcher & Jeffrey, 2007). This is why exploring collaborations between China and the UK presents an interesting case from two distinctive perspectives and can help understand the complex process of their collaboration.

2.2 Academic dependency theory

As illustrated above, for non-Anglo-American countries there have been significant difficulties in language and practices when integrating nationally based social sciences to the global pool. Alatas (1999; 2000) argued that many non-Anglo-American social scientists were propelled to imitate Anglo-American practices and became dependent on them in six aspects, including theoretical concepts, publishing media, research aid, technology of academic activities, investment of academic activities, and academic skill demand. Therefore, not many independent social research is produced in the national systems of non-Anglo-American countries (Alatas, 2000). Additionally, the academic dependency potentially leads to the division of academic labour which reinforces the unequal academic relations (Alatas, 2003). Anglo-American social scientists tend to undertake more theoretical work and non-Anglo-American social scientists are more likely to undertake empirical work (Alatas, 2003). To mitigate the academic dependency mechanism, social scientists

from non-Anglo-American countries are encouraged to integrate local historical experiences and cultural practices into new theories and concepts, which can contribute to the diversity of global social sciences (Alatas, 2001).

China and the UK represent two roles in the academic dependency relations and the exploration of research collaborations between Chinese and UK researchers may surface their different motivations, objectives, and approaches. Particularly in this study, I seek to investigate three issues. First, why Chinese and UK researchers have chosen to collaborate with each other. Second, whether Chinese and UK researchers have perceived the academic dependence in the process of their collaborations. Third, how Chinese and UK researchers have perceived collaboration results in relation to a more inclusive and diversified social research field.

3. Literature Review

This section reviews some previous studies related to the patterns, motivations, and experiences of international research collaborations in social sciences.

3.1 Trends and Patterns

China's social science research saw a gradual change in research patterns from no collaboration to national collaboration and international collaborations over the past four decades; an increasingly broadened network of international collaborators is found in SSCI-indexed publications (Li & Li, 2015; Zhang et al., 2020). Over 40 per cent of China's SSCI publications from 1978 to 2013 have at least one international affiliation (Liu, Hu, Tang, & Wang, 2015). China's most frequent collaborators include the USA, Hong Kong, the UK, Australia, and Canada (Liu, Ma, Song, Qian, & Lin, 2021).

Studies also found that international publications attract more citations than other modes of research (Li & Li, 2015). While high citation does not necessarily guarantee research quality and impact, it serves as a useful proxy for academic recognition, which has been one of the fundamental drivers for scholarly communication (Schott, 1998; Marginson, 2021). Using field weighted citation impact and citation counts as the indicator of research quality, China's internationally co-authored publications in social science were found to perform better when

collaborating with developed countries and top universities (Zhe, Lu, & Xiong, 2021). At a disciplinary level, psychology had most international collaborations, followed by economics, and social issues (Liu et al., 2021).

China-UK collaborations have grown exponentially; China-UK co-authored papers in all disciplines increased from 750 in 2000 (1 per cent of the UK output) to 16,267 in 2019, accounting for 11 per cent of all the UK output (KCL, 2021). China is also projected to take over the US to be the biggest research collaborator of the UK (KCL, 2021). The increase in publication volumes in the UK research system and other major European systems has depended mostly on internationally co-authored publications (Kwiek, 2021). Additionally, different funding conditions of international research collaborations such as funding institutions and thematic funding logic were found to lead to projects with diverse team dynamics, research agenda, and management strategies in European Research Area (Kosmutzky & Wohler, 2021).

3.2 Drivers and motivations

The international collaborations of social science research are driven by a mix of professional or personal factors.

Enhancing productivity and academic recognition is one driver of international collaboration. Internationally co-authored publications tend to attract more citations and help collaborators obtain advantages in research assessment and professional recognition (Hazelkorn, 2015). Access to resources and funding also motivates researchers to engage in international research collaborations. About 60 per cent of China's funded international co-publications from 2009 to 2013 in SSCI were co-funded or solely funded by foreign funding agencies (Liu et al., 2015). It appeared challenging for Chinese social scientists to attract foreign funding without international collaborators (Liu et al., 2015). Additionally, emerging scientists sometimes collaborate with established international scientists for more visibility, citation, and recognition (Wagner, Whetsell, & Leydesdorff, 2017).

Cognitive fulfilment is an important personal driver for international research collaborations. Researchers gain cognitive accumulations through the collective

desire of academic breakthroughs (Chen, Zhang, & Fu, 2019). Theoretical enrichment that can sparkle new insights tends to occur in inter-cultural international collaborations (Frenken, Hardeman, & Hoekman, 2009). International collaborations also help build intellectual affinities that help enlarge the academic network and enhance communications (Winkler, Glänzel, Levin, & Stephan, 2015).

In this study I explore the variety of motivations of China-UK education research collaborations through quantitative patterns and researcher experiences.

3.3 Researchers' experiences

Based on the structure and power relations of global and national science systems, researchers may encounter difficulties in languages, different academic practices, and the balance of local realities. How China and UK researchers perceive their experiences and challenges in research collaborations is explored in this study.

Some studies documented the unequal relations between researchers in the international research collaborations. For instance, in an international development project some collaborating researchers from Southern countries reported to have experienced significant power asymmetries regarding access to funding and the right to design 'the parameters and rules' (Zingerli, 2010, p. 217). Some international research collaborations have displayed increasingly equal relations. In research collaborations between France and Algeria there have been fewer cases of colonial dominance and subordination relations reported by collaborating researchers (Leperlier, 2018).

While collaborators' diverse cultural and academic background can enrich research collaboration, they sometimes create misunderstandings and increase communication costs (Mabey, Wong, & Hsieh, 2014). Many pointed out trust-building before collaboration as the solution to maintain cross-cultural international collaborations (Wildemeersch & Masschelein, 2018; Fransman & Newman, 2019). Dusdal and Powell's (2021) longitudinal study found that the organisation and

structured management of work packages and tasks can be difficult for international team because of different working and communication styles.

In summary, the literature review examined current studies on the patterns, motivations, and experiences of international collaborations in social research. This study seeks to explore the similarities and distinctiveness of the case of China-UK education collaboration compared to previous research and contribute to the more comprehensive understanding of international research collaboration. Therefore, three research questions are as follows:

- (1) How have China-UK education research collaborations developed over the past two decades?
- (2) Why have researchers from China and the UK engaged in China-UK education research collaborations?
- (3) How have researchers from China and the UK perceived their experiences in China-UK education research collaborations?

4. Methodology

To answer the research questions I implement an explanatory sequential mixed methods design. It starts by exploring the first research question on the trends and patterns of China-UK collaborations through quantitative bibliometric analysis. Bibliometric analysis has been widely utilised in mapping research performance and collaboration patterns (Lee & Bozeman 2005; Wagner et al., 2015). While bibliometric data surfaced the large-scale broad patterns of social science research and collaboration, many studies highlighted the need to integrate bibliometric analysis with qualitative data to gain more nuanced understanding (Zhang et al., 2020). This is why semi-structured interviews are conducted to answer the second and third research questions concerning researchers' motivations and experiences. Semi-structured interview is selected due to the latitude for interviewers to elicit contextual and in-depth narratives (Segal, Coolidge, O'Riley, & Heinz, 2006). Although I replaced in-person interviews with online format in the face of Covid-19 pandemic, the digital-based interviews possess similar synchronous communication

experiences (Janghorban, Roudsari, & Taghipour, 2014). The final conclusions are generated through the integration of both quantitative and qualitative data.

Bibliometric analysis is conducted first because the quantitative patterns illuminate further interview questions and contain information for interviewee selection.

'Education' studies are selected by the 'Education & Educational Research' Research Area classification in Web of Science. Table 1 details the five steps of this study.

Table 1. Process of the explanatory sequential mixed methods.

| | Steps | Procedure |
|---|--|--|
| 1 | Quantitative data collection | – Data downloaded from SSCI, Web of Science and CSSCI using different search strings |
| 2 | Quantitative data analysis | – Data cleaning – Data categorisation using Excel and Python text mining – Data analysis to visualise trends and patterns through Excel |
| 3 | Qualitative data collection | – Sending interview invitations based on the categorised sub-datasets in Step 2 – Conducting 2 pilot interviews – Refining questions and conducting 8 semi-structured interviews |
| 4 | Qualitative data analysis | – Data familiarisation and reduction – Open coding via NVivo 12 – Clustering and connecting codes |
| 5 | Integration of quantitative and qualitative data | – Synthesising quantitative trends and qualitative themes – Interpreting findings in relation to prior research |

4.1 Data sources

Bibliometric data was sourced mainly from Social Science Citation Index (SSCI) and complemented by Chinese Social Sciences Citation Index (CSSCI). SSCI and CSSCI were chosen to present a comparative picture of China and the UK research trends in national and international systems. Social Science Citation Index (SSCI), Web of Science has been a widely used data source due to its wide publication coverage at a global level (Mingers & Leydesdorff, 2015). The database of CSSCI is added to provide evidence of national research systems from a comparative perspective (Zhang et. al., 2020). CSSCI documents the publications of a selection of over 500 Chinese social science journals and their citation information (Institute for Chinese Social Science Research and Assessment, 2021). The timespan of

2001-2020 was chosen in that China's internationally co-authored publications in SSCI only started to grow substantially after 2001; co-authorship data prior to that year were scarce and unsuitable for calculation (Li & Li, 2015).

4.2 Bibliometric methods

4.2.1 Bibliometric data collection

This study includes all types of publications such as journal articles and books as they are all important modes of research dissemination. Datasets from SSCI are presented in Table 2. The detailed search string is attached in Appendix A.

Table 2. SSCI datasets.

| | Name | Records |
|---|---|-----------|
| 1 | World social science publications | 1,977,735 |
| 2 | World education publications | 264,481 |
| 3 | Mainland China-participated social science publications | 56,502 |
| 4 | UK-participated social science publications | 257,594 |
| 5 | Mainland China-participated education publications | 4,988 |
| 6 | UK-participated education publications | 34,851 |
| 7 | Mainland China and UK collaborated education publications | 312 |

Referencing the discipline classification by ECOOM¹ (Expertise Centrum O&O Monitoring) (Glänzel, Thijs & Chi, 2016), the search for all social science publications at a world level returned 1,977,735 results and 264,481 results in education. National outputs were based on the addresses of authors' affiliated institutions. For instance, China-participated publications have at least one affiliation located in 'China'. Hong Kong and Macao produced publications were excluded in this study in that the research policy and higher education management in the two areas are distinctive from Mainland China's system (Zhang et al., 2020). 'China' in this study refers to 'Mainland China' for the conciseness of writing. China-UK collaborated publications are defined as having at least one Chinese affiliation and at least one UK affiliation.

In CSSCI, two datasets were collected based on the advanced search function on cssci.nju.edu.cn on 14th June 2021. 'All CSSCI publications' dataset contains all records from 2001 to 2020. Education publications were collected by choosing 'Education' in the Subject menu. The results are in Table 3. No definition on

'Education' was found in CSSCI either. The author had checked randomly chosen records to ensure that the results of 'education publications' conformed with the definition noted earlier (AERA, 2021).

Table 3. Bibliometric datasets in CSSCI: 2001-2020.

| | Name | Records |
|---|------------------------|---------|
| 1 | All CSSCI publications | 171,054 |
| 2 | Education publications | 4,988 |

4.2.2 Bibliometric data analysis

Bibliometric patterns are analysed through Excel and Python text mining in terms of (1) productivity (number of publications and share in total); (2) funding agencies (name of funding agency and number of funded publication); (3) authors' affiliation (first affiliation and other affiliation); (4) citation (the country and number of referenced publication).

Altogether 4988 education publications participated by China and 28512 by the UK in SSCI were collected. Each of the two datasets comprises of four subsets: (1) international collaborated publications that have first affiliation with the discussed country (ICP), (2) international collaborated publications that have first affiliation in other countries (3) single-author publications, and (4) nationally collaborated publications. International collaborated publications include datasets (1) and (2); non-international collaborated publications include (3) and (4). China-UK publications have three subsets. Details are presented in Table 4 and Table 5.

Table 4. Different types of education publications participated by UK or by Chinese researchers in SSCI: 2001-2020.

| | UK | China |
|--|-------|-------|
| Education publications | 28512 | 4986 |
| - International collaborated publications | 7680 | 2315 |
| - First affiliation is with the discussed (UK/China) country | 3026 | 1311 |
| - First affiliation is not with the discussed country | 4654 | 1004 |
| - Non-international collaborated publications | 20832 | 2671 |
| - Single author publications | 14272 | 958 |
| - Nationally collaborated publications | 6560 | 1713 |

Table 5. Different types of China-UK collaborated education publications in SSCI: 2001-2020.

| | Number of publications |
|---|------------------------|
| China-UK education publications | 312 |
| - Publications that have Chinese first affiliation | 169 |
| - Publications that have UK first affiliation | 108 |
| - Publications that have first affiliation in other countries | 35 |

4.3 Interviews

As illustrated in the research process, the selection of participants was based on the bibliometric datasets. Data on the names of the collaborating authors, their affiliated institutions, and the number of their publications were compiled as the participant pool for interviewee recruitment. The recruitment process combined purposive sampling and snowballing sampling strategies to both diversify the participants' profile and recruit more participants based on recommendations (Merriam, 1998). The criterion in participant selection included 1) varied numbers of co-authored publications; 2) a roughly balanced profile of UK and Chinese affiliations; 3) roughly similar numbers of male and female participants; 4) various academic titles (e.g. professor, associate professor, lecturer, research fellow); 5) features of affiliated institutions (whether or not is research-intensive university). The selection was enabled by bibliometric data and google search of researchers' profiles and CVs.

Interview questions mainly focus on the motivations, process and experiences of interviewees' collaboration projects, as attached in Appendix B.

In total, 31 invitations were sent out and 10 accepted to be interviewed. Two academics were randomly selected for pilot interview and eight for the official interview. Their profiles are displayed in Table 6. Interviews were conducted between April 2021 to June 2021. The duration of interviews ranged from 30 min to one hour. Interviews with the four Chinese participants were conducted in Chinese and translated into English by the researcher; interviews with four UK participants were conducted in English. Criteria of determining institutions' level of research intensity used the categorisation of Russell Group in the UK and 'Double First-Class' in China. Russell Group includes 24 world-class research-intensive universities (Russell Group, 2021). The 'Double First-class' project is a similar benchmark project in China that include 137 first-class universities and disciplines (Ministry of

Education, 2021). UK universities were distinguished as either one of Russell Group Universities (UK-R) or not (UK-NR). If the university (not discipline) affiliated with the Chinese interviewee is first-class university, they are marked as MC-DF; if not, MC-NDF.

Table 6. Profile of interview participants.

| | Pseudonym | Current affiliation | Gender | No. of China-UK publications | Academic title |
|---|-----------|---------------------|--------|------------------------------|---------------------|
| 1 | UK-R1 | UK | F | 1 | Professor |
| 2 | UK-R2 | UK | M | 2 | Professor |
| 3 | UK-R3 | UK | M | 2 | Consultant |
| 4 | UK-NR | UK | M | 3 | Senior lecturer |
| 5 | MC-DF1 | Mainland China | F | 2 | Assistant professor |
| 6 | MC-DF2 | Mainland China | M | 2 | Associate professor |
| 7 | MC-NDF1 | Mainland China | F | 1 | Associate professor |
| 8 | MC-NDF2 | Mainland China | F | 1 | Associate professor |

Qualitative data analysis centres on the inductive and systematic examination of cross-cases similarities and the generalisation of higher-order theme and concepts (Punch & Oancea, 2014). After transcribing and translating the raw interview data, open coding and cross-case comparisons were applied to help the researchers cluster codes into themes (Saldana, 2014). More detailed findings are reported in the next section.

5. Findings

This section presents quantitative and qualitative findings to portray a comprehensive picture of China-UK education research collaboration. Quantitative data depicted the broad trends and patterns of collaboration features and the qualitative shown more nuances in researchers' collaborating experiences.

5.1 Trends and patterns

Four aspects are presented, the global and national publication volumes, international research collaboration, citations, and funding.

5.1.1 Global and national publication volumes

At a global level, Figure 1 shows that the volume of world social science publications has increased from around 70 thousand in 2001 to 140 thousand in 2020. The volume of education outputs follows a similar growth pattern with its share

in all social science publications increasing steadily from 9 per cent to 15.9 per cent in two decades, which may indicate the growing visibility of education studies as a social science discipline on a world scale.

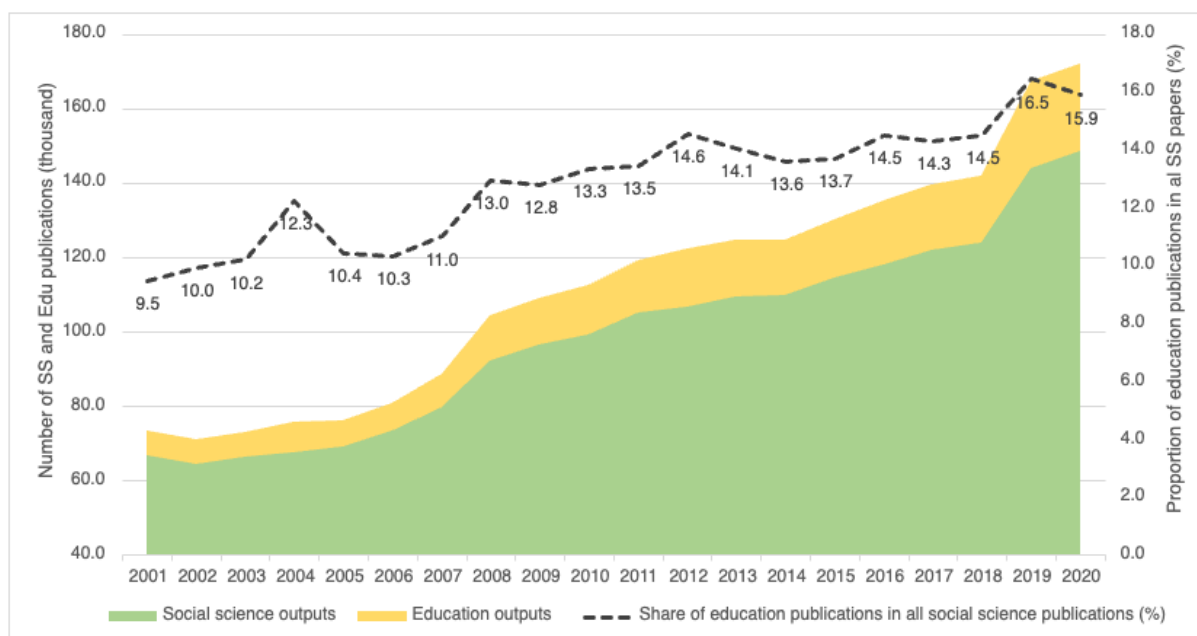


Figure 1. Outputs of world social science publications and education publications indexed in SSCI: 2001-2020.

At a national level, the UK’s world share in social science outputs was still substantially bigger than China’s, despite a narrowing gap between the two countries (Figure 2 and Figure 3). The UK remained a major contributor of world social science and China’s contribution is growing rapidly over the past two decades. The UK’s share of education outputs, however, has dropped continuously, in contrast to China’s share of education publications growing from 0.4 per cent to 4.5 per cent over the two decades.

Figure 4 compares China’s education publications in SSCI and CSSCI in the past two decades. The number of CSSCI-indexed education publications started to decrease after 2008 when SSCI-indexed publications continued to grow. It led to the increase in the share of SSCI-indexed education publications from almost zero in 2001 to about 14 per cent in 2020. While CSSCI is still the dominant publishing platform, an increasing number of education researchers are choosing SSCI-based journals as another platform to publish their work.

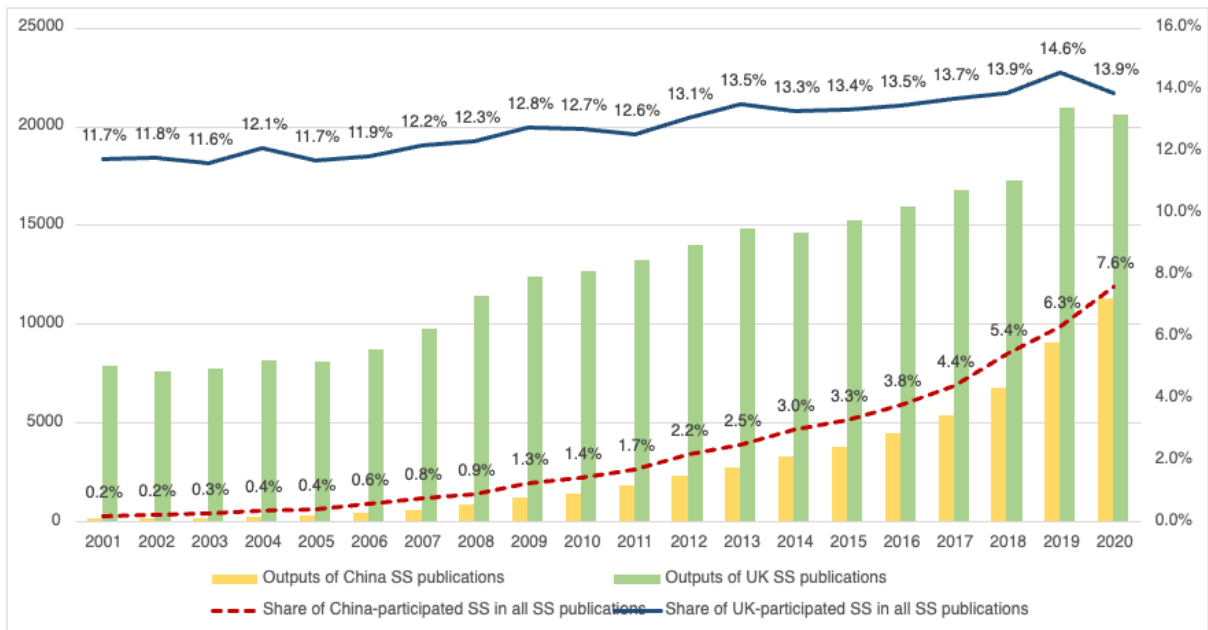


Figure 2. Outputs and share of China-participated and UK-participated social science publications in all social science publications indexed in SSCI: 2001-2020.

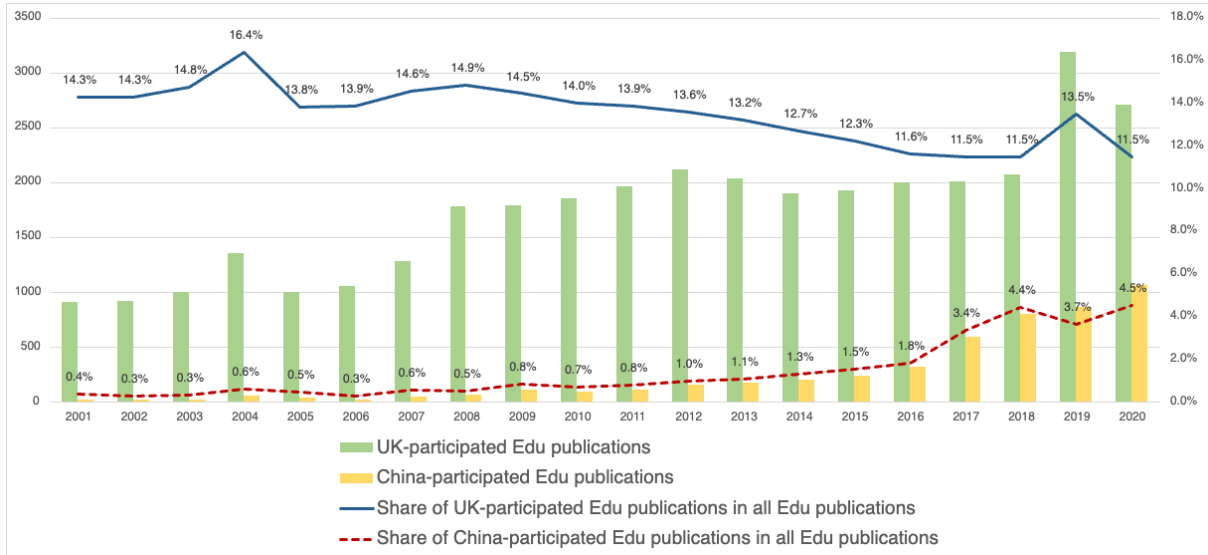


Figure 3. Outputs and share of China-participated and UK-participated education publications in all education publications indexed in SSCI: 2001-2020.

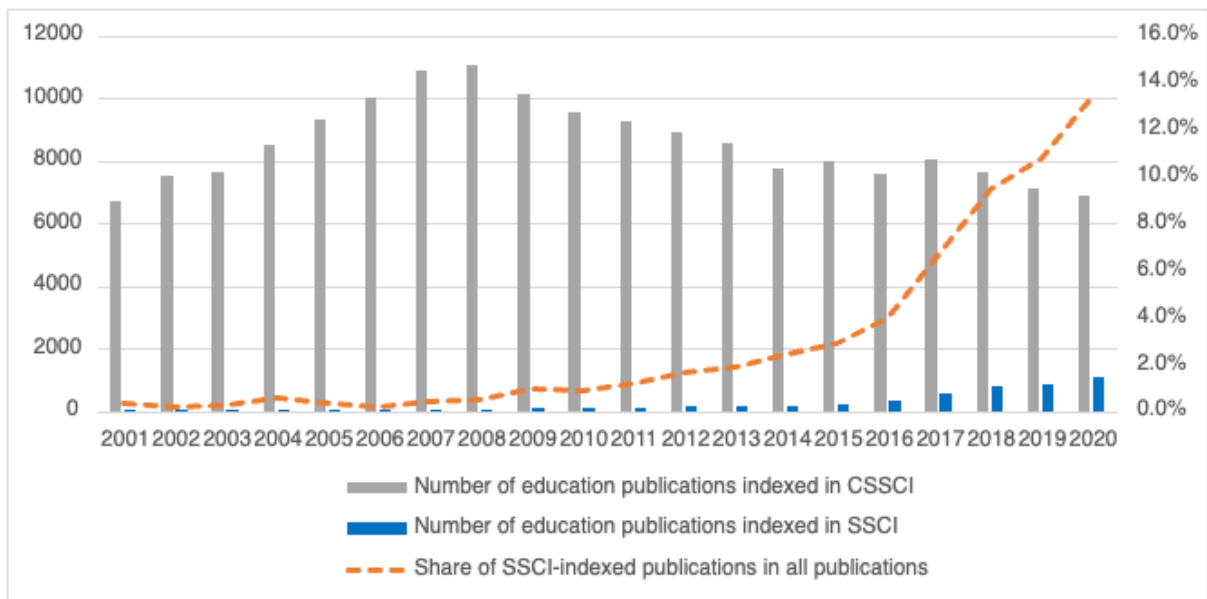


Figure 4. Number of education publications indexed in SSCI and CSSCI: 2001-2020.

5.1.2 International collaborations

The share of internationally collaborated publications in China-participated education publications can be described as an initial turbulence and a gradual growth from 2017 to 2020 (Figure 5). In China’s internationally collaborated education publications, the share of Chinese first affiliation started to grow steadily from 2012 to 2017 and plateaued during 2017-2020 at 65 per cent (Figure 6). In the case of the UK, the international collaboration rate in education publications increased rapidly from 5 per cent in 2001 to around 35 per cent in 2020 (Figure 7), while the rate of UK first authorship swung between 35 per cent and 45 per cent during the twenty years (Figure 8). China’s share of international co-authored education publications was persistently higher than that of the UK while China’s share of first affiliation in internationally co-authored publications only began to catch up with that of the UK since 2014.

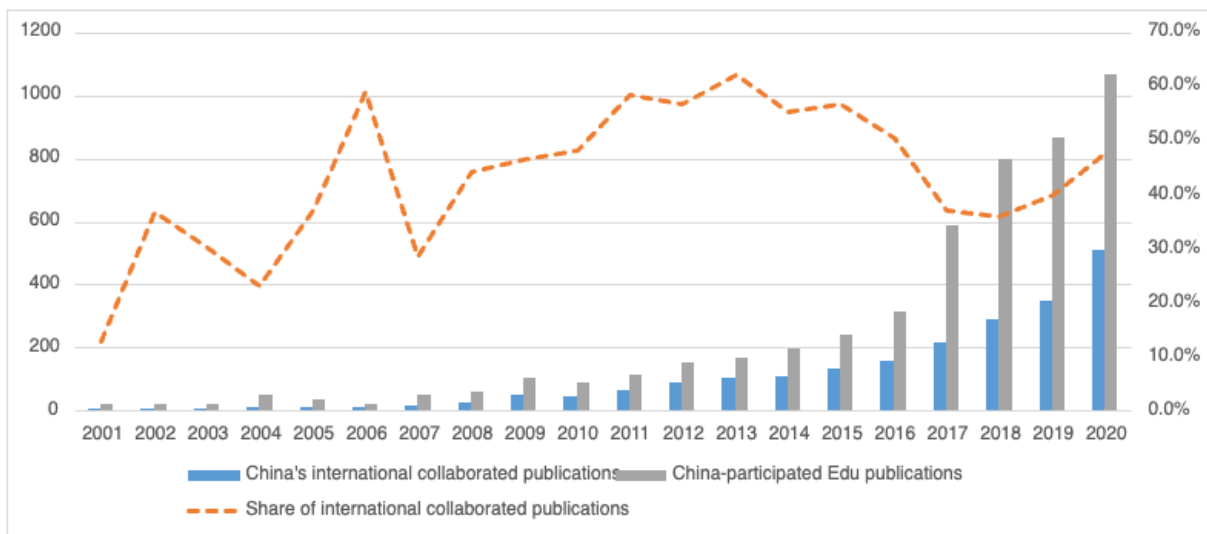


Figure 5. Output and share of international collaborated publications in all China-participated education publications indexed in SSCI: 2001-2020.

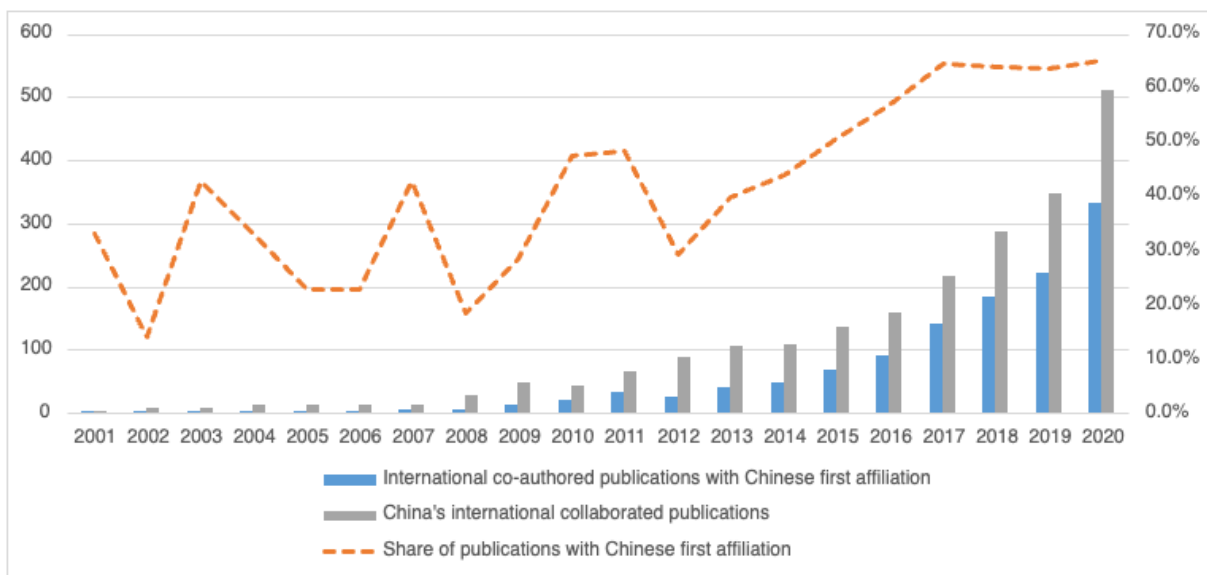


Figure 6. Outputs and share of China-led education publications in all China's international collaborated publications indexed in SSCI: 2001-2020.

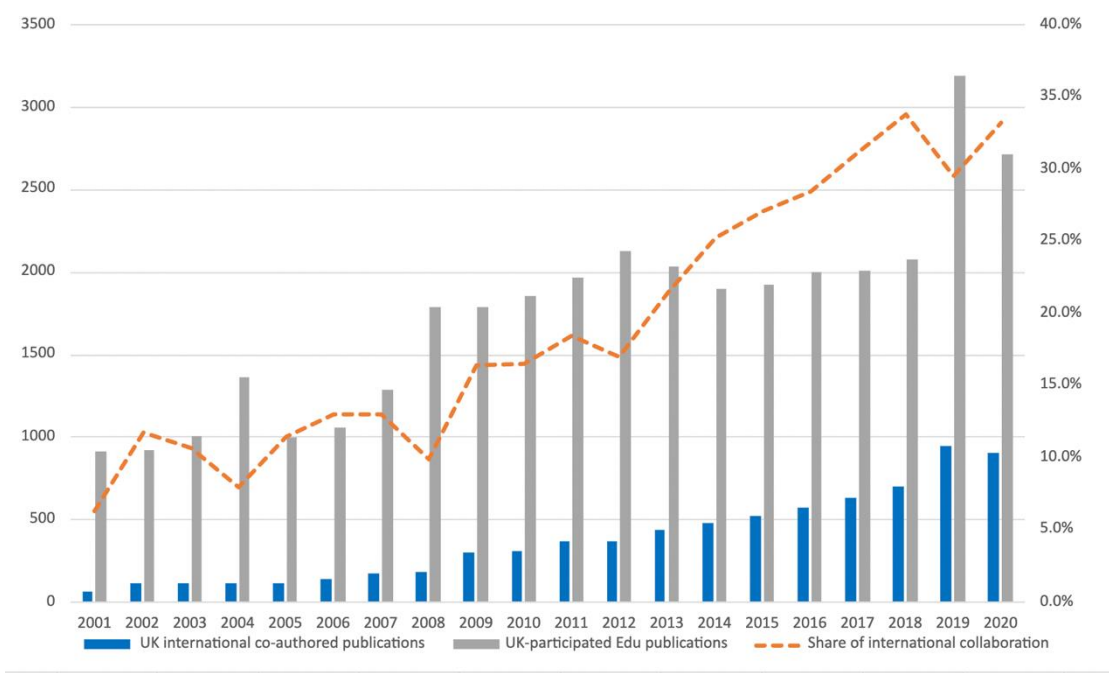


Figure 7. Output and share of international collaborated publications in all UK-participated education publications indexed in SSCI: 2001-2020.

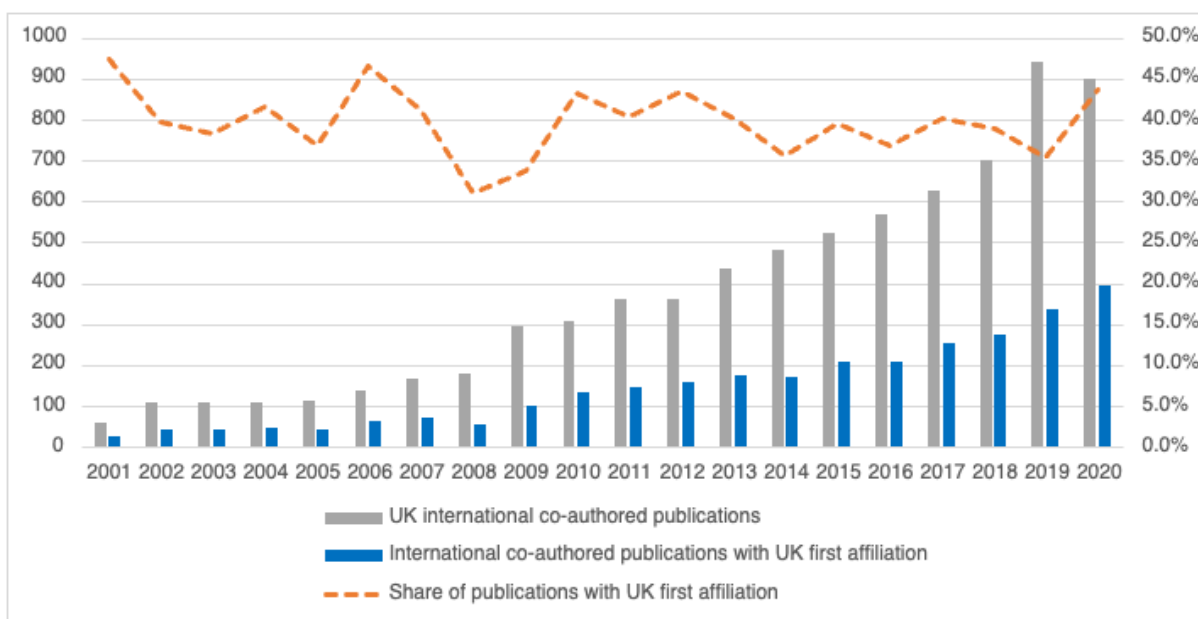


Figure 8. Outputs and share of UK-led education publications in all UK's international collaborated publications indexed in SSCI: 2001-2020.

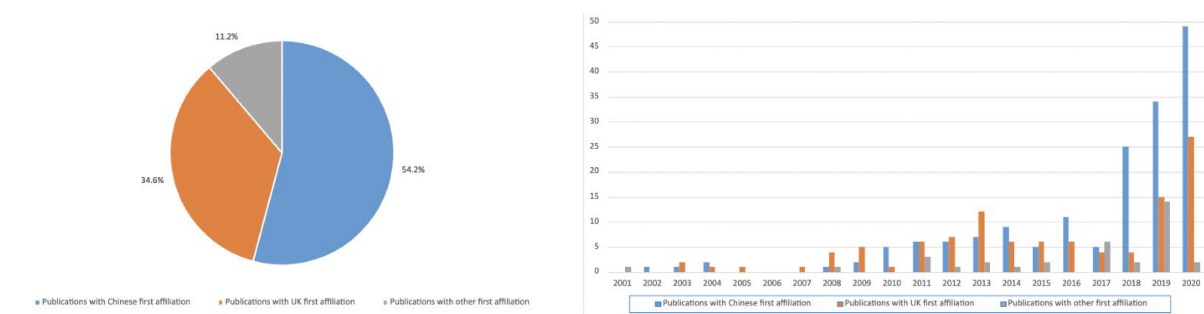


Figure 9. Number and share of first authorship in China-UK education publications indexed in SSCI from 2001-2020.

Among all the China-UK collaborated education publications, more than half had Chinese first affiliation, and 34.6 per cent had UK first affiliation. The bar chart showed that publications with Chinese first affiliation started to increase rapidly after 2017 (Figure 9).

5.1.3 Citations

Citation source analysis manifested the scholarly communication between academic communities and the visibility of cited researchers and countries (Mosbah-Natanson and Gingras, 2014). Table 7, 8 and 9 presented the ten most cited countries in China-participated education publications, UK-participated education publications, and China-UK education publications. For China, Chinese sources accounted for the biggest share, followed by USA and Australia. Three of ten countries/regions that were cited most by China were not in Anglo-American areas. In the UK's case, the biggest citation source in the past two decades was from England (21.6%), followed by USA (21.0%) and Australia (9.0%). All of the ten countries/regions that were cited most by the UK were in Anglo-American areas except for China. In China-UK publications, the share of China's publications as citing sources (27.6%) was higher than that of the UK publications (18.0%). Five countries appeared in all three citation profiles: the USA, Australia, Spain, Canada, and Germany. For both China and the UK, the US was the second biggest citation source after their own country. While Iran was not in the top ten citing sources for either China or the UK, it appeared as a frequently cited country for China-UK collaborative publications, indicating that China-UK collaboration may enhance the global visibility of Iranian social science.

Table 7. Ten most cited countries and regions in China-participated education publications indexed in SSCI: 2001-2020.

| Countries/Regions | Records | Share of all citations |
|-------------------|---------|------------------------|
| PEOPLES R CHINA | 8483 | 28.1% |
| USA | 7006 | 23.2% |
| AUSTRALIA | 2195 | 7.3% |
| ENGLAND | 2027 | 6.7% |
| TAIWAN | 1658 | 5.5% |
| SPAIN | 1570 | 5.2% |
| CANADA | 1254 | 4.2% |
| TURKEY | 1038 | 3.4% |
| GERMANY | 840 | 2.8% |
| MALAYSIA | 723 | 2.4% |

Table 8. Ten most cited countries and regions in UK-participated education publications indexed in SSCI: 2001-2020.

| Countries/Regions | Records | Share of all citations |
|-------------------|---------|------------------------|
| ENGLAND | 72214 | 21.6% |
| USA | 70232 | 21.0% |
| AUSTRALIA | 29980 | 9.0% |
| CHINA | 18387 | 5.5% |
| SPAIN | 16851 | 5.0% |
| CANADA | 15493 | 4.6% |
| GERMANY | 12377 | 3.7% |
| SCOTLAND | 11313 | 3.4% |
| NETHERLANDS | 9481 | 2.8% |
| SWEDEN | 5281 | 1.6% |

Table 9. Ten most cited countries and regions in China-UK education publications indexed in SSCI: 2001-2020.

| Countries/Regions | Records | Share of citations |
|-------------------|---------|--------------------|
| PEOPLES R CHINA | 869 | 27.6% |
| ENGLAND | 567 | 18.0% |
| USA | 473 | 15.0% |
| AUSTRALIA | 314 | 10.0% |
| TAIWAN | 125 | 4.0% |
| CANADA | 118 | 3.7% |
| SPAIN | 114 | 3.6% |
| TURKEY | 112 | 3.6% |
| IRAN | 98 | 3.1% |
| GERMANY | 88 | 2.8% |

5.1.4 Funding

Funding information drawn from bibliometric data presented the countries of funding agencies and the number of publications that were funded. As shown in Table 10 and 11 education research in China and the UK were primarily funded by the agencies in their own country, together with some USA agencies. In the case of China-UK collaborated publications, about three quarters of all the publications that had funding information were funded by at least one Chinese agency (Figure 10 and Table 12).

Table 10. Top ten funding agencies in China-participated education publications.

| Funding Agencies | Country | Records |
|---|---------|---------|
| National Natural Science Foundation of China NSFC | China | 399 |
| Fundamental Research Funds for The Central Universities | China | 126 |
| Ministry of Education China | China | 109 |
| National Social Science Foundation of China | China | 93 |
| National Social Science Fund of China | China | 69 |
| China Scholarship Council | China | 66 |
| Peak Discipline Construction Project of Education at ECNU | China | 57 |
| United States Department of Health Human Services | USA | 51 |
| National Institutes of Health NIH USA | USA | 50 |
| National Science Foundation NSF | USA | 45 |

Table 11. Ten biggest funding agencies in UK-participated education research.

| Funding Agencies | Country | records |
|---|-----------|---------|
| UK Research Innovation (UKRI) | UK | 1485 |
| Economics Social Research Council (ESRC) | UK | 1166 |
| European Commission | EU | 455 |
| Medical Research Council UK (MRC) | UK | 182 |
| National Institute for Health Research (NIHR) | UK | 151 |
| Welcome Trust | UK | 114 |
| Arts Humanities Research Council (AHRC) | UK | 108 |
| United States Department of Health Human Services | USA | 98 |
| National Institutes of Health (NIH) USA | USA | 95 |
| Australian Research Council | Australia | 86 |

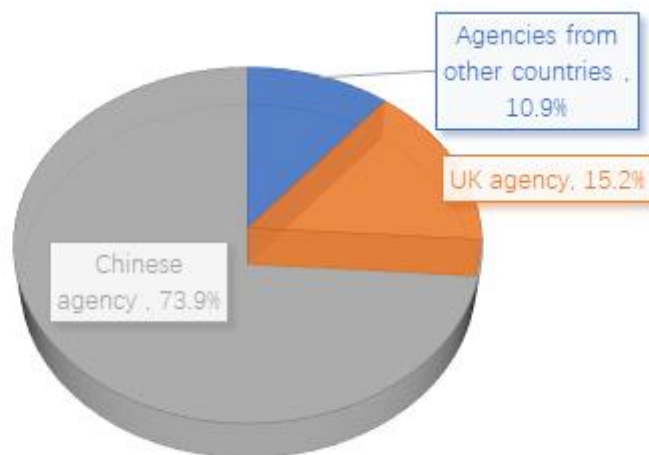


Figure 10. Funding agencies in China-UK education publications indexed in SSCI: 2001-2020.

Table 12. Ten biggest funding agencies in China-UK education research.

| Funding Agencies | Country | Records |
|--|---------|---------|
| National Natural Science Foundation of China NSFC | China | 9 |
| China Scholarship Council | China | 7 |
| Peak Discipline Construction of Education East China Normal U | China | 7 |
| Economic Social Research Council ESRC | UK | 6 |
| UK Research Innovation UKRI | UK | 6 |
| Fundamental Research Funds for The Central Universities | China | 4 |
| The British Council in India | UK | 3 |
| Comprehensive Discipline Construction Fund of Faculty of Education | China | 2 |
| British Academy | UK | 2 |
| Chinese National Social Science Fund | China | 2 |

In summary, regarding productivity, there seem to be a narrowing gap between China and the UK in social science and education research outputs. While CSSCI is still the dominant publishing platform for China, an increasing number of Chinese education researchers are choosing SSCI-based journals as the other publication platform. In terms of international collaboration, China's share of international co-authored education publications were persistently higher than that of the UK while China's share of first affiliation in internationally co-authored publications only began to catch up with the UK since 2014. Among all the China-UK collaborated education publications, more than half had Chinese first affiliations. Concerning citations, for both China and the UK, the US was the second biggest citation source after their

own country. China had more citations from non-Anglo-American countries than the UK. China-UK co-publications may enhance the global visibility of social research from countries such as Iran. In the aspect of funding, education research in China and the UK are primarily funded by agencies in their own country while three quarters of China-UK publications were supported by at least one Chinese funding agency.

5.2 Researchers' experiences and perceptions

This section presents the qualitative data in five categories: (1) the initiation of collaborations, (2) the distribution of responsibilities, (3) challenges in collaboration, (4) the dissemination of collaboration results, (5) reflections on international collaborations.

5.2.1 The initiation of collaborations

Interviews revealed diverse personal and professional motivations that prompted the establishment of China-UK collaborations.

The increased publication volumes and easier publication access motivate some researchers to collaborate internationally: 'you still have to produce good work, but it may be easier to get published if you are collaborating internationally' (UK-NR); 'When you start a new career you need to seek out people - you don't have very much time' (UK-R2). Some researchers regard the cognitive fulfilment as a stronger motivation than publication:

My thoughts are substantially extended when working with my UK collaborator. I love working with her to analyse some data even though sometimes they don't not result in publications. (MC-NDF2)

Visiting scholar projects, exchange programs and international employment also provided opportunities for China-UK collaborative education research. Two UK-based academics (UK-R1; UK-R3) reported overall five collaboration projects with six Chinese visiting scholars hosted in the UK. Most of them were supported by Chinese governmental funding and they came to produce a paper with their UK supervisors (UK-R1; MC-NDF1).

Academic UK-NR found that when overseas researchers came to work in the UK, they tended to 'bring with them contacts from home countries and forge more international collaborations through that'. He also expressed concerns in the prospect of such international collaborations when some scholars are leaving the UK due to the Brexit. Academic MC-DF2 shared similar views, 'I've collaborated with various foreign-based scholars but only one of them is not ethnic Chinese because communication is easier.'

Mixed attitudes were found towards reaching out to unacquainted academics for collaborations. Academic UK-NR accepted an invitation email from a China-based researcher because she 'was able to provide abundant information about her departments, websites of her university, and details of her previous research in the same field'. Their collaboration turned out to be 'quite prolific' and they 'produced two papers and one book chapter together in less than one year' (UK-NR). In contrast, academic UK-R1 does not accept unacquainted collaboration-seekers due to the high volume of such requests.

There were some unconventional collaborations initiation during the interview. Academic-UK-R1 shared a policy-oriented collaboration between one Chinese institution and her UK institution: 'It took a bit of negotiation because their way of using external help in reforming research and development I think was not common in China'. Academic UK-R1 recalled one 'weird' collaboration where the research project turned out to be a Chinese 'business promotion' trying to use the UK 'brand'.

5.2.2 Distribution of responsibilities

In some collaborations theoretical and empirical work were distributed in a more equal manner while others were less balanced.

Collaborations based on visiting scholar routes tend to be similar to a mentor-mentee relationship. Academic UK-R3 understood his role as a 'more experienced advisor' that provided suggestions in theoretical contents, writing conventions, and choices of publishing journals based on the empirical work conducted by the Chinese visiting scholars. Interestingly, while Chinese visiting scholar MC-NDF1 described the UK partner as 'supervisor', academic UK-R3 commented that 'supervisor is not the right

word – they were treated as academics, not students’. The boundaries between teaching, learning, and collaborating in this case can be blurry.

Some contributions were less clear-cut in theoretical and empirical contributions and involved mutual learning and negotiations from both sides. Academic UK-NR and academic MC-NDF2 both had multiple co-authored papers with the same collaborator respectively, which provides valuable insights into the evolution of research partnerships.

Initiated through email, academic UK-NR’s collaboration with his partner started from more theoretical contributions from the UK side and more empirical work from the Chinese side. Their second co-authored paper drew on different datasets from the first one with two collaborators ‘both analysed and reported data from scratch’: ‘We were both in for the project from day one as equal partners’. In their third ongoing project, both researchers would be involved in theoretical and empirical work. Their collaboration has developed towards an increasingly equal partnership in terms of shared responsibility in theoretical and empirical work.

Academic MC-NDF2 shared similar collaboration experiences with her long-term UK partner. Her self-position transformed from a ‘learner of an internationally prestigious scholar’ to a more equal collaborator where their expertise can ‘complement each other’. Motivated by a shared interest in the Chinese social reality, academic MC-NDF2 mainly provide ‘an insider perspective’ based on her first-hand experiences, which would then be ‘theorised and conceptualised’ by the UK collaborator into a ‘more systemic framework’. She recalled one incident of disagreement when she insisted on using ethnography methods and her partner insisted on classroom observation. The disagreement was eventually addressed through asking a third-party’s comments. Both collaborators later gained a deeper understanding of each other’s design rationale and agreed to write two papers that apply both methods respectively. In this partnership, through the integration of their theoretical knowledge and understanding of the reality, new insights are nourished and distributed.

5.2.3 Challenges in collaborations

Factors that sustain or challenge the process and social dynamics of China-UK education research collaborations emerged from the interviews.

At a personal level, publishing in both languages and moving between Chinese and international academic systems can be a challenge for China-based researchers. Even for renowned Chinese researchers, 'moving to an international stage' is quite difficult if they do not have experiences in English academic writing (UK-R3).

Competitions among collaborators for recognition, resources and rewards may tension the social relations in collaborations.

The tension is a kind of competitive spirit fuelled by institutional pressure and expectations. It's difficult for the collaboration when you find your so-called partners are actually more ambitious for their personal and institutional progress than the collaboration progress. (UK-R2).

Challenges also derived from the shifting international landscape where more complex political interests were at play:

It [the collaboration project] was suspended by COVID. But to be honest, I don't think it would resume because the landscape has changed. In both countries, collaborations have become more politicised - a global feature of our not-so-brave new world. People are much more restrictive about who we work with and why and what we value - that's a very complex debate. (UK-R1)

To address these challenges, many highlighted the value of trust building and cultural awareness. While much of scholarly communications are conducted online, 'in the end the relationship is key' (UK-R1). Cultural awareness was brought up repeatedly, highlighting the need for understanding each other's working habits and academic traditions. In some cases, the 'obstacles' of cultural differences were 'what makes a project interesting' (UK-R2). Additionally, the different level of politeness and criticality in academic culture can be difficult for both sides when the UK academics were 'raised to horn their criticality' and more used to 'argue about every aspect related to the research' than Chinese researchers (UK-R1; UK-R2).

I'm not used to being treated with deference by colleagues. We [UK researchers] might come across as quite difficult and rude [to the Chinese collaborators]. (UK-R1)

There's a cultural investment in politeness and maintain good relationships, which could be quite tricky when you are uncertain about some implicit rules. (UK-R2)

5.2.4 Dissemination of collaboration results

The dissemination of China-UK education research collaborations mainly takes form of co-authored publications. It requires considerations regarding reward distribution, journal selection and language choice.

Regarding distribution of first authorship and other types of recognition, Academic UK-R1 revealed her two strategies: 'allowing everyone to be the first author' and 'not hijacking all the data in one paper'. Academic UK-R3 gives first authorship to whoever conducted the empirical work. When he assisted in the writing of some visiting scholars, they had first authorship.

When choosing journals, China-based scholars 'mostly work in the top impact factor journals driven by the administrative pressure' (UK-R1; MC-NDF1), which may 'have contributed to the quick growth of China's research' (UK-NR). In comparison, UK-based academics prioritised target audience and match of topics when choosing a journal as 'high impact factor was not included in the criteria of REF (Research Excellence Framework)' (UK-R1; UK-R2; UK-R3).

The majority of co-publications documented in the interview were in English. Noteworthy, Academic UK-R1 shared her uncommon experience of co-publishing a paper in Chinese language in a CSSCI-indexed journal: 'Publishing in the local professional journal in the native language can lead to lot more impact'. This belief echoes the publishing culture in China where referencing Chinese sources and writing in Chinese are encouraged in addition to writing and referencing English papers (MC-NDF2).

5.2.5 Reflections on international collaborations

Participants reflected more broadly on the nature, values, and limitations of international collaborations.

From a validity angle, academic UK-NR believed internationally collaborated research provide opportunities to include more contexts and empirical evidence that can make the 'arguments more robust and transferable' and the theories more 'applicable to other contexts'. The research results can be utilised by a larger community. Some regard international collaborations as the only way to address global human problems in the long run:

One of the unfortunate things we now see in the world is that everybody is retreating into the nations. This is very sad because if we are going to tackle the very common global issues we've got, we can only do that globally - we can't do it in our own little silo. (UK-R1)

However, some academics expressed concerns about the growing tendencies to engage in international collaborations under administrative pressure:

There're some things that need to be developed by following your intuition and your impulse as an individual. Launching every project as something that has to be achieved with another country or institution will compress research findings and may lead to more homogeneity. (UK-R3)

Some large-scale and intervention-based international collaborations 'failed to deliver because the deeper ideas and theory were not be properly worked through' (UK-R3). This potentially explains some academic's preference to collaborate internationally on empirical research rather than theoretical work (MC-DF2).

Funding did not seem to be a significant driver or a potential source of conflict in international collaborations in education discipline. 'There's hardly any funding at all' (UK-NR) and researchers tend to 'have their own projects and funding' (MC-NDF2). In the rare cases where there was grants and funding, academic UK-R2 expressed his preference to write grant proposals with domestic colleagues due to easier team management. Comparatively in natural science, 'multi-million drug development' may

incur disagreement in funding distribution among international collaborators (UK-NR).

Some researchers reflected on the academic environment in China and the UK. Academic MC-NDF1 regarded China's collaboration culture as more 'utilitarian' when more people compete for first authorship and high impact factor journals due to institutional assessment. While it is perceived less directly in UK academia, academic UK-R2 can still feel the tension 'in the values between people in the front line and people in management'. At an institutional level, academic UK-NR noticed that the education departments in Chinese universities seemed to each have a clearer focus of research area than department in the UK and other countries.

To summarise, qualitative findings present five dimensions in researcher experiences in China-UK education collaborations. They add to the nuances of collaboration process that cannot be captured in quantitative trends.

6. Discussions

This section discusses research findings in relation to previous literature on six aspects.

6.1 Global and national systems

Findings in this study illustrated that the academic activities in the global and national social science systems are distinctively different for Chinese researchers but not for UK researchers. Bibliometric data revealed that the overall productivity and rate of international co-authorship in education research differ greatly in China's national system (CSSCI) and the global system (SSCI). Well-published Chinese researchers in CSSCI still face enormous challenges if they seek to achieve global visibility in SSCI (UK-R3). No UK interviewees have reported the feeling of a divided research system; they tend to follow the same set of research and publishing rules and values.

International research collaborations serve as a platform to introduce nationally active researchers into the global system for Chinese researchers, and as a space to integrate social realities and theoretical frameworks based in different contexts for

both Chinese and UK researchers. Some China-based interviewees sought to publish their work internationally through the help of their UK collaborators. The collaboration can ease the challenges they may encounter if they try to gain global visibility by themselves due to lack of knowledge in English writing and research assessment criteria (Li & Yang, 2020). Chinese researchers can be more easily introduced to the global system and gain knowledge about its rules through international collaborations. Other researchers who have more experiences in the global system are more likely to see international collaboration as a site to enrich and expand their research findings through the integration of theoretical or social knowledge from different contexts.

6.2 Academic dependency

Many Chinese researchers seem to rely on their UK partners in aspects of theoretical concepts and publishing media but not in other aspects. As noted earlier, non-Anglo-American social sciences tend to embody Anglo-American academic practices and values, which has led to the dependence in theoretical concepts, publishing media, research aid, technology of academic activities, investment of academic activities, and academic skill demand. In the case of China-UK education collaborations, many Chinese interviewees shared the experience of learning from their UK collaborators in the selection and analysis of theoretical framework, the structure of literature review, and in writing skills and publication advice. No interviewees shared perceptions of dependence on other aspects.

The social relations in the China-UK collaboration in this study seem to be equal and respectful rather than dominant and dependent. While academic MC-NDF2 started the collaboration with her senior UK partner as a young emerging researcher, in the case of disagreement, academic MC-NDF2 had the right to negotiate theoretical and methodological values with the UK collaborator. The disagreement was addressed not by academic MC-NDF2 giving in to the UK collaborator but by asking for the opinion from a third unbiased party. The collaboration process was not like the situation described in Zingerli (2010) where collaborators from the Southern countries felt they were instrumental to their partners from the Northern countries who have more control in research design and resources. The dependency termed

by Alatas (2003) is more often described by the Chinese interviewees as a 'learning process' rather than dependence relation. Some interviewees have increasingly tried to incorporate the Chinese social realities into their collaborative work, illustrating the awareness of integration and innovation. Future studies may benefit from applying a longitudinal perspective to investigate the characteristics and changing social relations of multiple-time collaboration partnerships.

Other aspects such as technology and investment of academic activities do not have a China-UK dependence relation based on findings in this study. Bibliometric data showed that the majority of China's publications were funded by Chinese funding agencies; in China-UK collaborative projects Chinese funding agencies supported a larger number of projects than UK agencies. Therefore, in international research collaborations China seem to have absorbed much knowledge from the UK in theoretical analysis and publication advice but remain self-sustained and autonomous in the other aspects of academic activities.

6.3 Motivations

Early career researchers are motivated to engage in international research collaborations more often by professional reasons while mid-career and senior researchers tend to collaborate internationally more for personal reasons. Interviews in my study corroborated findings in previous studies that the enhancement of productivity and academic recognition is one significant motivation of international collaboration (Hazelkorn, 2015; Liu et al., 2015). This is particularly true for emerging researchers who seek to accumulate publications at an early career stage within several years after gaining the PhD (UK-R2). Another motivation of international collaboration found in previous studies and this study is the expansion of academic network. Collaboration with one international researcher potentially establishes connection with the collaborator's department, university or other department working in similar research areas. Social fulfilment is found to be a motivation more often reported by mid-career and senior researchers; they simply enjoy the company of their collaborator or enjoy teaching next-generation researchers based on their own expertise.

My findings suggest that funding does not seem to be a significant motivator for either Chinese or UK researchers to engage in China-UK research collaborations. This is manifested in both bibliometric patterns and interviews. There is a relatively balanced China/UK distribution in the ten funding agencies that support most China-UK publications; six are Chinese agencies and four are UK agencies. Several interviewees said that funding in social research usually do not facilitate or inhibit the establishment or development of international collaborations because funding opportunities are scarce and collaborating researchers normally use their own funding to support the collaboration.

6.4 Political landscape

More broadly, the shifting political landscape can influence the process of international collaborations in unexpected ways. For instance, academic UK-R1's collaboration with China was suspended in that the growing political rivalry between China and the UK had led to academic distrust and fewer international collaboration opportunities. This is manifested in some recent policy documents that aim at managing risks in UK-China research partnerships. UK universities are encouraged to address risks of overseas universities illegitimately acquiring research and expertise or interfering with academic discourse (Universities UK, 2020; KCL, 2021). However, some argued that more opportunities for China-UK ties may appear in the future as China-US collaboration deteriorating due to political hostility and UK-European collaboration reducing due to Brexit (Marginson, 2020).

6.5 Chinese language as publishing medium

Some Anglo-American researchers such as academic UK-R1 in this study are aware of the exclusion of large volumes of social research produced in the national system of non-Anglo-American countries. She acknowledged the value of targeting a wider audience in collaborating with Chinese scholars and publishing in Chinese language and Chinese journals. Previous studies have not investigated the in-depth understanding of an Anglo-American researcher towards Chinese research system and Chinese language as the publishing medium. It can be inferred that international research collaborations provide the opportunity to enhance two-way knowledge communication and exchange by overcoming language and platform differences. It

complements the predominant knowledge flow from Anglo-American countries into China (Li & Yang, 2020).

6.6 Research leadership

Some previous studies interpreted the high rate of first authorship in internationally co-authored publications as the indicator of leadership in the collaboration project and further infer the national agency of the first affiliated country (Mosbah-Natanson & Gingras, 2014; Li & Li, 2015). Findings in this study suggest that this may not be accurate. While bibliometric data shows China has a bigger share in first authorship, many of these were based on visiting scholar schemes where Chinese researchers learn from their UK collaborators to publish internationally. They had the first authorship but did not act as the leader of the collaborative projects.

In many cases in the interview first authors usually meant undertaking more empirical work rather than the job of a leader or imposing control over other collaborators. In the projects when researchers rotate the role of first author among several publications, first authorship does not indicate any difference in the roles of the authors. Therefore, the interpretation of first authorship cannot be reduced to leadership but contains a variety of approaches whereby researchers disseminate reward and recognition for research results.

7. Conclusions

This study seeks to gain a comprehensive understanding of the patterns and dynamics of international research collaborations through the case of China-UK education collaborations. I understand social research activities as a two-system structure, the global and national systems. The power relations in the global science system is conceptualised through different levels of academic dependency in six aspects such as theoretical concepts and investment in academic research. Combining bibliometric analysis and semi-structured interviews, this study generates several conclusions that can help inform policymaking in research assessment and management.

Regarding the theoretical analysis, findings in this study confirm that the academic activities in the global and national social science systems are distinctively different for Chinese researchers but not for UK researchers. For Chinese researchers, international research collaborations appear to serve two purposes, as a platform to introduce nationally active researchers into the global system, and as a space to integrate social realities and theoretical frameworks based in different contexts. Additionally, the social relations in the China-UK collaboration in this study seem to be equal and respectful rather than dominant and dependent. Chinese researchers absorb much knowledge from the UK in theoretical analysis and publication advice but remain self-sustained and autonomous in other aspects of international collaboration activities. Researchers from both countries have increasingly showed the awareness of incorporating social realities of different contexts with established theories to seek enrichment and innovation.

In the aspect of collaboration process, early career researchers seem to be motivated more often by professional reasons when engaging in international research collaborations while mid-career and senior researchers tend to collaborate internationally for personal reasons. To target a wider audience and gain more impact, some Anglo-American researchers collaborating with Chinese scholars and publishing in Chinese language and Chinese journals, illustrating their awareness of the exclusion of non-Anglo-American social sciences in the global field. Such collaborations can provide opportunities for two-way knowledge communication and exchange by overcoming language and platform differences. Findings also suggest that the interpretation of first authorship requires more nuanced understanding in the various ways collaborators assign rewards and recognition, rather than equating it with leadership and control. More broadly, researchers need to be prepared for the shifting political landscape as it can influence the establishment and development of international collaborations in unexpected ways.

This study has some limitations. First, despite sending out interview invitations to researchers with a balanced profile of academic titles, I did not manage to recruit many mid-career and senior Chinese researchers or early-career UK researchers. This may lead to an incomplete picture of collaboration experiences of researchers

at different career stages. Further research can recruit more researchers with diverse academic titles and collaboration experiences. Second, the collaboration projects studied in my interviews generally have two or three researchers. There is a lack of large-scale international collaborations with potentially more complicated social relations and responsibility distribution, which can be explored in future studies.

APPENDIX

Appendix A. Information on the datasets from SSCI: 2001-2020.

| | Name | Search string | Records |
|---|---|--|-----------|
| 1 | World social science publications | SU= (Business OR Business, Finance OR Economics OR Hospitality, Leisure, Sport & Tourism OR Industrial Relations & Labor OR Management OR Planning & Development (Development Studies) OR Cultural Studies OR Demography OR Social Issues OR Social Sciences, Biomedical OR Social Sciences, Interdisciplinary OR Social Work OR Area Studies OR Asian Studies OR Urban Studies OR Communication OR Education & Educational Research OR Education, Special OR Information Science & Library Science OR Education, Scientific Disciplines OR Law OR Criminology & Penology OR International Relations OR Political Science OR Public Administration) | 1,977,735 |
| 2 | World education publications | SU=(Education & Educational Research) | 264,481 |
| 3 | Mainland China-participated social science publications | AD= ((China NOT Macau NOT Hong Kong) AND (Scotland OR (Wales NOT South Wales) OR 'Northern Ireland' OR England)) AND SU= (Business OR Business, Finance OR Economics OR Hospitality, Leisure, Sport & Tourism OR Industrial Relations & Labor OR Management OR Planning & Development (Development Studies) OR Cultural Studies OR Demography OR Social Issues OR Social Sciences, Biomedical OR Social Sciences, Interdisciplinary OR Social Work OR Area Studies OR Asian Studies OR Urban Studies OR Communication OR Education & Educational Research OR Education, Special OR Information Science & Library Science OR Education, Scientific Disciplines OR Law OR Criminology & Penology OR International Relations OR Political Science OR Public Administration) | 56,502 |
| 4 | UK-participated social science publications | AD= (Scotland OR (Wales NOT South Wales) OR 'Northern Ireland' OR England) AND SU= (Business OR Business, Finance OR Economics OR Hospitality, Leisure, Sport & Tourism OR Industrial Relations & Labor OR Management OR Planning & Development (Development Studies) OR Cultural Studies OR Demography OR Social Issues OR Social Sciences, Biomedical OR Social Sciences, Interdisciplinary OR Social Work OR Area Studies OR Asian Studies OR Urban Studies OR Communication OR Education & Educational Research OR Education, Special OR Information Science & Library Science OR Education, Scientific Disciplines OR Law OR Criminology & Penology OR International Relations OR Political Science OR Public Administration) | 257,594 |
| 5 | Mainland China-participated education publications | AD= (China NOT Macau NOT Hong Kong) AND SU=(Education & Educational Research) | 4,988 |
| 6 | UK-participated education publications | AD= (Scotland OR (Wales NOT South Wales) OR 'Northern Ireland' OR England) AND SU= (Education & Educational Research) | 34,851 |

7 Mainland China and UK collaborated education publications England)) AND SU= (Education & Educational Research)'

Appendix B. Interview questions.

| Questions | |
|-----------|---|
| 1 | How was each China-UK education collaboration initiated? |
| 2 | What was the collaboration process regarding the theoretical development and empirical work? |
| 3 | How did you feel about the collaboration process compared with individual work, domestic collaborations, or collaborations with other countries (beyond China or UK)? |
| 4 | How did you and your collaborators address the potentially challenges in collaborations? |
| 5 | What were the motivations in your collaboration with China (or UK) or what values do you see in international collaborations? |

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