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An International Comparison of Discipline Integration of the Commercial Contract Cheating Industry

Una comparación internacional de la industria de la compra-venta de trabajos académicos

Uma comparação internacional da indústria de compra- vendas de atividades acadêmicas

对商业合同作弊产业学科整合的国际化对比

التجارية العقود في الاحتيال قطاع في التأديبي للتكامل الدولية المقارنة

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Abstract

Commercial contract cheating, the act of requesting a third party to complete an assignment for payment, is a growing industry and poses a problem that academic institutions are trying to tackle internationally. The reach of the industry in nine fields of education and across four locations – Australia, the United Kingdom, Canada, and the United States – are analysed through an automated data-gathering process on a total of 4032 Google searches and with the help of a machine learning model trained to identify which results are essay mills. 49% of all results are found to be essay mills, 3247 of which results are found to be paid advertisements despite this being against Google's advertising policies. The fields of Arts and Humanities and Education are found to be at the highest risk of further exploitation by the industry. The paper concludes by recommending that the educational community continues to monitor the reach of the contract cheating industry and that it considers solutions to further promote academic integrity.

Keywords: contract cheating, essay mills, academic integrity

Resumen

El fraude académico basado en la suplantación, el acto de solicitar a un tercero que complete una actividad a cambio de un pago, es una industria en crecimiento y plantea un serio problema que las instituciones académicas están tratando de abordar a nivel internacional. En el presente trabajo se analiza el alcance de la industria de compra-venta de trabajos académicos en nueve áreas de conocimiento y en cuatro países (Australia, Reino Unido, Canadá y Estados Unidos). El método seguido se basa en un proceso automatizado de recopilación de datos sobre un total de 4032 búsquedas en Google y con la ayuda de un modelo de aprendizaje automático entrenado para identificar qué resultados son portales de compra-venta de trabajos académicos. El 49% de todos los portales analizados ofrece los servicios de elaboración de trabajos académicos, de los cuales 3247 resultados se publicitan a través de anuncios en Google, a pesar de que esto va en contra de las políticas publicitarias del buscador. Se considera que los campos de las artes, las humanidades y la educación corren el mayor riesgo de sufrir una mayor explotación por parte de la industria. El documento concluye recomendando que la comunidad educativa continúe monitoreando el alcance de la industria del fraude académico por suplantación y que considere soluciones para promover aún más la integridad académica.

Palabras clave: suplantación académica, compra-venta de trabajos académicos, integridad académica

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Resumo

A fraude de contratos comerciais, o ato de pedir a terceiros que realizem um trabalho a troco de pagamento, é uma indústria em crescimento e constitui um problema que as instituições académicas estão a tentar resolver a nível internacional. O alcance da indústria em nove áreas de ensino e em quatro locais – Austrália, Reino Unido, Canadá e Estados Unidos – é analisado através de um processo automatizado de recolha de dados num total de 4032 pesquisas no Google e com a ajuda de um modelo de aprendizagem automática treinado para identificar cujos resultados são "essay mills" (fábricas de ensaios). 49% de todos os resultados são considerados "essay mills", 3247 dos quais são anúncios pagos, apesar de tal ser contrário às políticas de publicidade do Google. Os domínios das Artes e Humanidades e da Educação são os que correm o maior risco de exploração pelo setor. O documento conclui recomendando que a comunidade educativa continue a monitorizar o alcance da indústria da fraude de contratos e que considere soluções para promover ainda mais a integridade académica.

Palavras-chave: fraude de contratos, essay mills, integridade académica

摘要

商业合同作弊，这种第三方以换取报酬为目的来完成相应任务的行为，已成为一项不断扩张的产业，也是全世界学术机构需要解决的问题。该研究范围包含了该产业覆盖的九个教育领域和四个国家（澳大利亚、英国、加拿大和美国）。我们对 4032 次谷歌搜索进行数据自动收集，并在机器学习模型的帮助下分析哪些结果是论文工厂。研究发现 49%的搜索结果都是论文工厂，其中 3247 个为付费广告，这与谷歌广告政策完全相悖。艺术、人文和教育是受该产业影响最深的领域。最后，研究一方面建议教育界对合同作弊保持持续的监视，另一方面也希望能够找到不断促进学术诚信的解决方案。

关键词：合同作弊、论文工厂、学术诚信

ملخص

تحاول مشكلة وتطرح متنامية صناعة ,أجر مقابل مهمة بإكمال ثالث طرف مطالبة أي ,التجارية العقود في الغش يعد - مواقع أربعة وفي تعليمية مجالات تسعة في الصناعة هذه نطاق تحليل يتم .دولي نطاق على معالجتها الأكاديمية المؤسسات على بحث عملية 4032 إجمالي على الآلية البيانات جمع عملية خلال من - المتحدة والولايات وكندا المتحدة والمملكة أستراليا جميع من 49% أن اكتشاف تم.المقال مصانع هي التي النتائج تحديد على نموذجتدريبهم .الآلي التعلم وبمساعدة Google لسياسات مخالفتها من الرغم على ,الأجر مدفوعة إعلانات عن عبارة منها 3247 وأن ،مقالات مصانع عن عبارة النتائج .الصناعة هذه قبل من الاستغلال لخطر عرضة الأكثر هي والتعليم الإنسانية والعلوم الفنون مجالات .الإعلانية Google تعزيز لمواصلة الحلول ودراسة الغش صناعة نطاق مراقبة التعليمي المجتمع يواصل بأن بالتوصية الوثيقة وتختتم الأكاديمية النزاهة

الكلمات الدالة: عقود الغش, مصانع المقال ,النزاهة الأكاديمية

Introduction

Contract cheating, a term originally introduced by Clarke and Lancaster (2006), takes place when a student outsources or attempts to outsource assignment completion requests to a third party. Where students pay that third party, the term commercial contract cheating is often used to describe the behaviour. The websites to which students outsource their work are often known as essay mills, although the assignment types that can be produced go beyond essays. As commentators have observed, commercial contract cheating is supported and enabled by a developed industry, for which the opportunity for profit appears to be the main concern (Ellis et al, 2018; Lancaster, 2019).

When students engage in contract cheating, they are breaching academic integrity norms and may end up benefiting from qualifications that they do not deserve if that is not addressed. The act of contract cheating presents

challenges to academic institutions as it undermines academic integrity and ultimately devalues the academic qualifications that the majority of students work hard to obtain.

Contract cheating is a nuanced and difficult problem. As well as being an area that universities and higher education providers must attend to, contract cheating is also an active area of academic research. Several summaries of current research and practice as it relates to the contract cheating field exist (Ahsan et al, 2022; Curtis et al, 2022; Lancaster and Clarke, 2016).

Estimates about the extent of contract cheating vary, but all indicators from student surveys are that the challenge has been growing in recent decades, with suggestions that one in seven students worldwide may have used contract cheating providers (Newton, 2018). Behaviour similar to contract cheating dates back until at least the 1930s (Eaton et al, 2022).

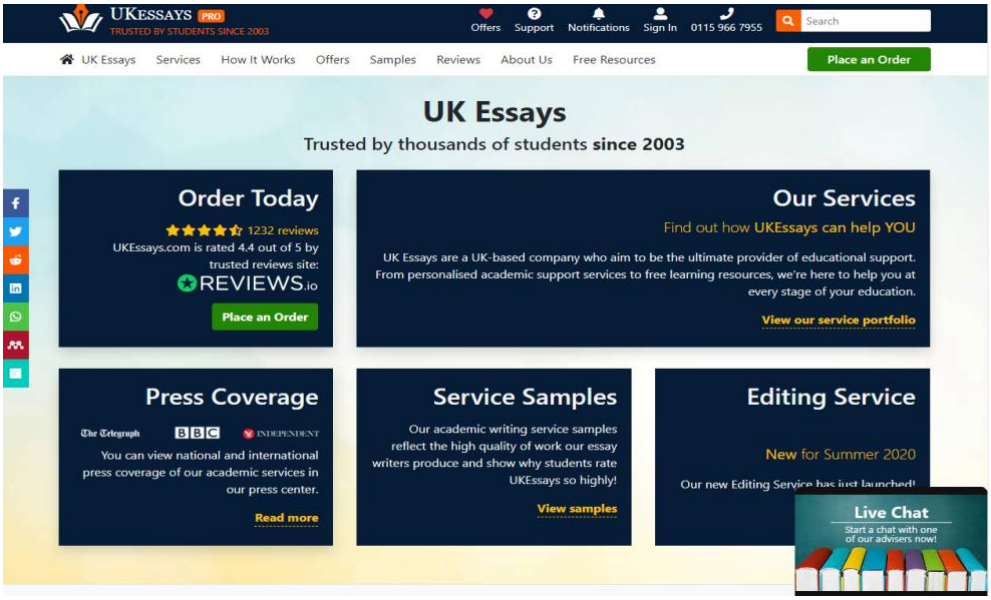
This paper aims to examine how far the contract cheating industry are attempting to reach potential customers using search engines such as Google, an area that has previously only been considered on a small scale. Lancaster (2020) collected data specific to Google search results for the United Kingdom (UK) that simulated how a student may look for support across 19 subject areas. This paper expands on that foundational approach by using an automated data-gathering solution, significantly increasing the depth of the investigation to cover further countries, assignment types and search terms. The results demonstrate how students may be exposed to commercial contract cheating providers when looking for assistance, despite them not initially planning to cheat.

Contract cheating website classifications

The investigation on three main types of websites identified through Google searches for assignment help and support. This section of the paper overviews those three types of websites providing the background for the classifications used later in the paper.

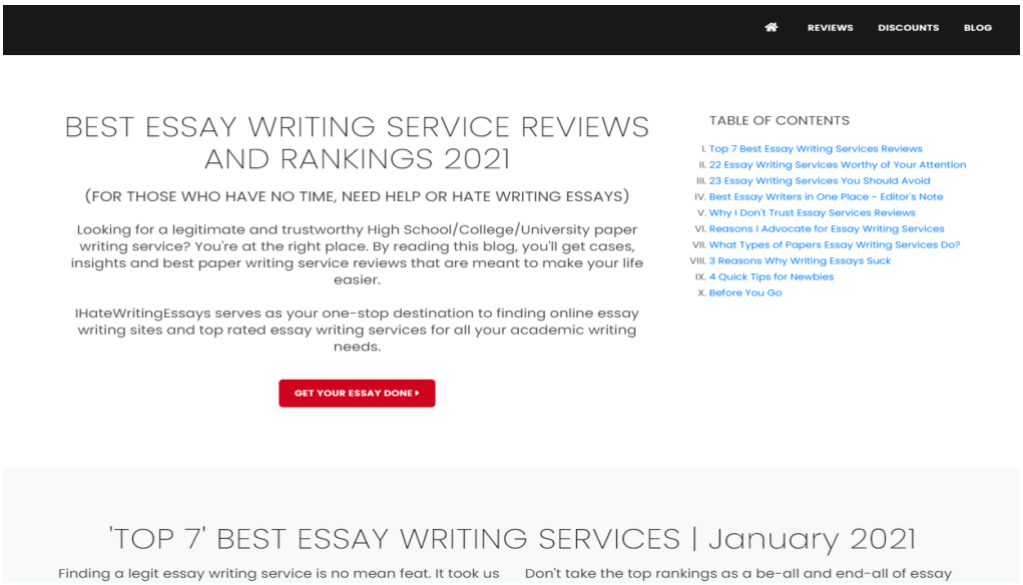
The first type of site found is one that blatantly helps students to breach academic integrity, referred to in this paper as an essay mill. This is a website that directly offers contract cheating services to students. An example of an essay mill can be seen in Figure 1. Essay mills may advertise a plethora of paid services aside from essay writing, such as writing dissertations, preparing university applications, and sometimes even offering to assess student work.

Figure 1. Screenshot of an example essay mill – www.ukessays.com



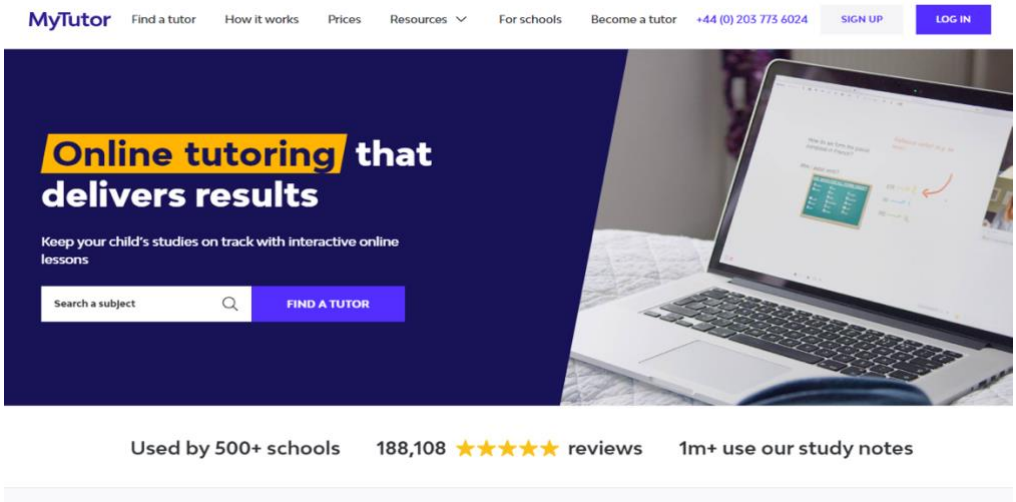
The second classification, referred to here as *likely* essay mills, cover those sites that operate on the borders of acceptability but may link to or promote contract cheating provision, for example through hosting advertisements, recommending essay mills, providing links that pay the website owner a commission, or offering editing and proof reading services for upgrades to bespoke writing services may be possible. An example of a review site is shown in Figure 2.

Figure 2. Screenshot of an example likely mill - www.ihatewritingessays.com



The third and final type of website identified are those that have no relation to contract cheating, which this study will refer to as *not* essay mills. Some examples include general informational websites, software solutions, and those tutoring services that make it clear that they will not complete assessed work for students. An example of such is given in Figure 3. However, it must be noted that is never possible to know exactly what happens when a student is connected with a tutor and develops a direct relationship with that tutor that continues outside the referring site.

Figure 3. Screenshot of an example not mill – www.mytutor.co.uk



Method

A script was written to automatically collect the text from the websites that appeared as search results on the first page of Google. The searches made were composed of different combinations of an optional subject, a required assignment type, and an optional 'other' term, to represent the searches students may make when seeking help for their assignments. 27 subject terms were identified for 9 fields of education (3 terms per field), along with 9 assignment types and 3 'other' terms, forming a total of 28*9*4=1008 (28 and 4 since the optional fields were each represented with an additional empty string, '') unique search terms. An illustration of how these terms were combined to form the final searches can be seen in Figure 4.

Figure 4. Construction of search terms

Subject Terms
Agriculture
Ecology
Veterinary
Arts
History
Languages
Business
Economics
Law
Childhood Studies
Education
Teaching
Architecture
Construction
Engineering
Medicine
Nursing
Healthcare
Information Systems
Computer Science
Information Technology
Mathematics
Natural Sciences
Statistics
Journalism
Psychology
Social Sciences
[blank]

+

Assignment Types
Essay
Assignment
Dissertation
Thesis
Homework
Paper
Research Paper
Coursework
Presentation

+

Other Terms
Help
Buy *
Writing Service
[blank]

* Where used, the term *buy* was positioned at the start of the search string

The 'other' terms provide a method of differentiating between searches for support and possible attempts to breach academic integrity. Half of these terms ('buy' and 'writing service') search for essays explicitly, and the other half ('' and 'help') represent the more innocent case of a student looking for support.

The nine fields of education identified were those listed by the Organisation for Economic Co-operation and Development

(OECD) for tertiary-level enrolment numbers by field in OECD economy countries for the 2017 academic year (OECD, 2020). Table 1 shows the mapping between fields of education and subject terms. These subject terms were chosen by the researchers to allow for a comparative and broader study of the fields of education they represent. The OECD data is presented in accordance with OECD's terms of service.

Table 1. Selected search subject terms for each field of education identified by OECD

Field of education	Search Subjects
Agriculture, Forestry, Fisheries, and Veterinary	Agriculture
	Ecology
	Veterinary
Arts and Humanities	Arts
	History
	Languages
Business, Administration, and Law	Business
	Economics
	Law
Education	Childhood Studies
	Education
	Teaching
Engineering, Manufacturing, and Construction	Architecture
	Construction
	Engineering
Health and Welfare	Medicine
	Nursing
	Healthcare
Information and Communication Technologies	Information Systems
	Computer Science
	Information Technology
Natural Sciences, Mathematics and Statistics	Mathematics
	Natural Sciences
	Statistics
Social Sciences, Journalism and Information	Journalism
	Psychology
	Social Sciences

Table 2 shows the tertiary-level enrolment numbers for the fields of education selected across four majority-English-speaking countries for which enrolment numbers across the fields of interest were readily available. These countries are United Kingdom (UK), Canada (CA), United States (US), and Australia (AU).

Table 2. Tertiary-level education enrolment numbers for the 2016/2017 academic session.

	Countries			
Field of Education	**UK**	**CA**	**US**	**AU**
Agriculture, Forestry, Fisheries, and Veterinary	26,075	29,511	158,920	16,557
Arts and Humanities	366,424	205,103	3,212,731	205,689
Business, Administration, and Law	476,829	373,950	3,283,966	533,774
Education	150,690	83,998	1,219,524	179,574
Engineering, Manufacturing, and Construction	221,541	193,466	1,462,122	157,300
Health and Welfare	396,304	231,766	3,437,484	344,465
Information and Communication Technologies	106,073	60,512	848,615	81,561
Natural Sciences, Mathematics and Statistics	365,203	153,310	1,303,419	103,472
Social Sciences, Journalism and Information	271,188	234,103	2,024,860	122,229
Total	2,380,327	1,565,719	16,951,641	1,744,621

The assignment types were chosen to represent a wide range of generic forms of assignments a student may be looking for help in. The 'other' terms were chosen to represent the students both looking for general support and those looking for contract cheating services directly. This approach allows for a broader and deeper investigation into the prevalence of essay mills in the identified fields of education, and a comparative insight into the likelihood of students with differing intentions coming across them.

Examples of the final composed searches include 'computer science research paper help', 'buy education essay', as well as any of the assignment types on their own in the case where no search subject or 'other' term was specified due to them being optional.

Data collection and mill classification

Data on Google's first result page was collected for the 1008 search terms for each of four international locations on the 4 of September 2020. Simulated methods were used to get results for these locations through Google's search parameters. The canonical names of the geolocations used to generate the encoded location parameters in this study, as identified from Google documentation, were:

- Toronto, Ontario, Canada,
- Boston, Massachusetts, United States,
- Sydney, New South Wales, Australia,
- Lambeth Borough of London, United Kingdom

In each search, personalised results were also turned off through another search parameter to ensure any previous number of searches had no effects on the results returned for a later search.

The data collected for each result consisted of the result's URL, its title and description, and a capture of all the text between enclosing HTML tags on the web page linked by the URL. Search results for which data collection failed, for reasons such as them being PDF files, or having the connection to their sites rejected by the firewall or due to an expired SSL certificate, were recorded as inaccessible.

Standard Natural Language Processing (NLP) techniques were used to pre-process the captured data into a canonical form of representation by removing all non-alphabetical characters and common English stop-words, lowercasing, and lemmatisation.

Machine-learning models were trained on 375 web pages that were manually labelled by one of the researchers to produce a classifier capable of labelling a website based on its text content as a 'mill', 'likely mill', or 'not mill'. The title, description, and text capture of the website from each result was combined into a single long text. A Bag of Words (BoW)

representation was used to extract features from the text, along with a Term Frequency Inverse Document Frequency (TF-IDF) method to increase the weightings of label-specific features and decrease the weightings of words that were common to all labels in the training data set. Bigrams (or pairings of contiguous words) were also considered.

The models were trained on 78 mills, 36 likely mills, and 261 not mills. This would be in close proportion to the number of each type of site one could expect to find in a search, but as likely mills are rarely found, the number of them in the training data was inflated, following experimentation, to ensure the models had enough data to predict unseen ones accurately. Data points on numerous disciplines were picked to ensure the classifier ranked discipline-specific features in the text lowly, and instead placed heavier weights on the more important features characteristic of each label such as 'order now' and 'writing service' for a mill, as one might expect.

Duplicate page entries were rejected from the training data set by keeping the page's URL on record and then checking if the URL for a new entry already existed in the set. Domain-level entries, those entries from within the same domain but different pages, were allowed as a typical essay mill will advertise their writing services for a wide range of topics and disciplines, and to ensure there was enough data to train the model sufficiently.

Several models were trained and tuned, namely Multinomial Naïve Bayes, Linear Support Vector Machine, Complement Naïve Bayes, and Stochastic Gradient Descent. The resulting classifiers produced an accuracy score of 61, 69, 86, and 94% respectively on a test data set of 117 pages. For the purposes of this study, the SGD classifier was picked for use as it had the greatest accuracy on the testing data set. The top 10 most important features the final classifier identified for each label can be seen in Table 3.

Table 3. Top 10 features for each label as identified by the Stochastic Gradient Descent classifier.

Label	Top 10 features (most to least important)
Mill	order, writing service, writer, pages word, services, patient, social, nurse, expert, literature
Likely Mill	editor, proofreading, editing, review, mark, analysis, free, experience, address, style
Not Mill	words, support, require, design, solutions, allow, hsc, slides, topics, powerpoint

Following Lancaster's (2020) method but adapting it to work with the much larger volume of data gathered, three measures were calculated for each field of education:

- *Organic results* – the percentage of organic results that were classified as mills.
- *Paid results* – the percentage of paid advertisement results that were classified as mills
- *Market saturation* – a measure from 0-100 based on the number of students enrolled per essay mill result found, designed to act as an indicator for how saturated the contract cheating industry is in one field of education, relative to the other fields. The higher the score, the more saturated that field is. The most saturated fields were scaled to 100 in each country.

These three measures were then rated using a high-medium-low priority system, and points awarded. The criteria used to allocate points can be found in Table 4. Each field of education therefore receives a score from 0-6, which aims to identify in which fields mills are already well-established, and those that have potential for the essay mill industry to expand in. A higher score indicates that a field has been exploited more than one with a lower score.

Table 4. The criteria used to rate the three scores of measure, and the points awarded for each rating.

	High (2 points)	Medium (1 point)	Low (0 points)
Organic Results	Above 50%	Between 40 and 50%	Below 40%
Paid Results	Above 59%	Between 50 and 59%	Below 50%
Market Saturation	Above 70	Between 35 and 70	Below 30

Limitations

The study presented is naturally limited due to the availability of discipline-specific enrolment numbers and is focused on the English language. Not every possible assignment type or search term that a student could use is considered, since students may use search terms more specific to their own discipline (an example may be a Computer Science student searching for programming help). Sampling is also based only on a single location in each country, with results restricted to the first page of Google results. The data was collected during the Covid-19 pandemic, so it may not provide for a perfect longitudinal examination of contract cheating provider reach. There are also natural limitations when a machine learning model is used for classifications. The researchers consider the ability to process such a large volume of data as a more than suitable trade-off for these limitations.

Results

The data collection stage captured data on a total of 41,401 search results, including paid ads, across all 4 locations, 20,451 of which – 49% - were identified as essay mills. 1192 unique mills were found and 107 of which had adverts on the first page of results. The 10 most common mills found can be seen in Table 5.

Table 5. The 10 most found mills across all locations, and the number of times they were found across the 20,451 search results that classified as mills

Ranking	Mill	# of Times Found	Percentage of times found out of all mills found
1	myassignmenthelp.com	820	4.01%
2	peachyessay.com	615	3.01%
3	customwritings.com	312	1.53%
4	ukessays.com	298	1.46%
5	advancedwriters.com	284	1.39%
6	myassignmentservices.com	260	1.27%
7	essaypro.com	249	1.22%
8	onlineassignmentexpert.com	223	1.09%
9	allassignmenthelp.com	220	1.08%
10	assignmentgoals.com	200	0.98%

Searching for 'assignment' yielded the highest mill results at 78%, with 'homework' and 'essay' at 2nd and 3rd place, with 61 and 60% respectively. Relatively few mills were found for ‘presentation’, at 22%. These international rankings can be found in Table 6.

Table 6. Ranking of assignment types by the percentage of results that classified as mills across all searches with that assignment type.

Ranking	Assignment Type	Mill %
1	assignment	78.01%
2	essay	61.85%
3	homework	60.20%
4	coursework	51.66%
5	dissertation	48.72%
6	paper	41.16%
7	research paper	40.16%
8	thesis	36.57%
9	presentation	22.33%

Considering support and explicit terms alone, mills were dominating advertising space in both, with 60% of ads in support terms being mills, and 57% in explicit, despite 37% of all search results being mills for support terms, as opposed to 61% for explicit terms. Searching for 'writing service' yielded the most mills in organic results, with the percentage in each field of education ranging from 77 to 90%. Searches with the 'buy' term only had 44% of all search results being mills, whereas searches for 'help' had 50% mills. Searching with no specified other term yielded the fewest mill results, at 20%. Searches for 'help' also had 1940 paid results found in total, whereas the searches with no other term had only 361, 1157 and 223 of which were mills respectively. In comparison, searches for 'writing service' had 1448 paid results in total and only 672 of which were identified as mills.

Business, Administration and Law ranked the most affected by mills in terms of the percentage of all search results on subject terms in that field being mills, which stood at 61%. Health and Welfare came a close second, at 57%. The findings for these two fields are consistent with Lancaster's (2016) reports, which ranked the fields 1st and 2nd respectively in the discipline groups from which most contract cheating has been observed. The full international rankings can be seen in Table 7.

Table 7. Ranking of the fields of education by the percentage of results that classified as mills across all searches with the subject terms for that field

Ranking	Field of Education	Mill %
1	Business, Administration, and Law	60.98%
2	Health and Welfare	56.59%
3	Social Sciences, Journalism and Information	52.25%
4	Natural Sciences, Mathematics and Statistics	52.02%
5	Engineering, Manufacturing, and Construction	49.33%
6	Information and Communication Technologies	44.71%
7	Arts and Humanities	43.97%
8	Agriculture, Forestry, Fisheries, and Veterinary	39.29%
9	Education	39.27%

Country specific

Table 8 shows the percentages of mills across all search results for each field of education and country. The percentages range from 35 to 65%, with the United Kingdom holding the highest percentages in five fields of education and Canada holding the lowest percentages in six. The highest recorded percentage for each field of education is shown in *italics* in Table 8.

Table 9 shows the scores the fields of education in each country were awarded based on the criteria in Table 4. Table 10 shows those scores summed, and the total for each country. Most fields fall into the medium range which indicates they have already been exploited but there is still space for further growth.

Table 8. Percentage of results that classified as mills across all searches within each country with the subject terms for that field.

	Countries			
Field of Education	**AU**	**UK**	**CA**	**US**
Agriculture, Forestry, Fisheries, and Veterinary	*42.72%*	39.07%	36.10%	39.21%
Arts and Humanities	*46.18%*	43.02%	43.55%	43.16%
Business, Administration, and Law	59.85%	*65.28%*	60.65%	58.33%
Education	39.08%	39.36%	35.14%	*43.12%*
Engineering, Manufacturing, and Construction	*51.73%*	51.35%	45.39%	48.64%
Health and Welfare	57.47%	*60.29%*	55.48%	53.00%
Information and Communication Technologies	45.31%	*48.94%*	40.98%	43.24%
Natural Sciences, Mathematics and Statistics	51.73%	*53.12%*	50.81%	52.33%
Social Sciences, Journalism and Information	51.91%	*54.03%*	49.01%	53.80%

Table 9. Scores against the three measures - (organic results; paid results; market saturation) – for each field of education and country

	Countries				
Field of Education	**AU**	**UK**	**CA**	**US**	**Overall**
Agriculture, Forestry, Fisheries, and Veterinary	1;1;2	0;2;2	0;0;2	0;1;2	0;1;2
Arts and Humanities	1;2;1	1;1;0	1;2;0	1;1;0	1;1;0
Business, Administration, and Law	2;1;0	2;1;0	2;1;0	2;0;1	2;1;0
Education	0;2;1	0;1;1	0;0;1	1;2;1	0;1;1
Engineering, Manufacturing, and Construction	1;2;1	2;1;1	1;0;0	1;1;1	1;1;1
Health and Welfare	2;2;1	2;2;1	2;2;1	2;1;0	2;2;0
Information and Communication Technologies	1;1;2	1;2;2	0;1;2	0;2;2	1;2;2
Natural Sciences, Mathematics and Statistics|	2;2;2	2;1;0	1;2;1	1;2;1	2;2;1
Social Sciences, Journalism and Information|	1;2;2	2;2;1	1;1;0	2;2;1	2;2;1

Table 10. Scores against the three measures summed for each field of education and country

	Countries				
Field of Education	**AU**	**UK**	**CA**	**US**	**Overall**
Agriculture, Forestry, Fisheries, and Veterinary	4	4	2	3	3
Arts and Humanities	4	2	3	2	2
Business, Administration, and Law	3	3	3	3	3
Education	3	2	1	4	2
Engineering, Manufacturing, and Construction	4	4	1	3	3
Health and Welfare	5	5	5	3	4
Information and Communication Technologies	4	5	3	4	5
Natural Sciences, Mathematics and Statistics	6	3	4	4	5
Social Sciences, Journalism and Information	5	5	2	5	5
Total Score	38	33	24	31	32

The fields of education clustered into the high-medium-low priority system can be seen in Table 11.

Table 11. Fields of education clustered into the high-medium-low priority system for each country

Total Score	**Countries**				
	AU	**UK**	**CA**	**US**	**Overall**
High (5-6)	Natural Sciences, Mathematics and Statistics (6)				Information and Communication Technologies (5)
	Health and Welfare (5)	Health and Welfare (5)	Health and Welfare (5)		
		Information and Communication Technologies (5)			Natural Sciences, Mathematics and Statistics (5)
	Social Sciences, Journalism and Information (5)	Social Sciences, Journalism and Information (5)		Social Sciences, Journalism and Information (5)	Social Sciences, Journalism and Information (5)
	Agriculture, Forestry, Fisheries, and Veterinary (4)	Agriculture, Forestry, Fisheries, and Veterinary (4)		Information and Communication Technologies (4)	Health and Welfare (4)
	Arts and Humanities (4)	Engineering, Manufacturing, and Construction (4)	Natural Sciences, Mathematics and Statistics (4)	Education (4)	Agriculture, Forestry, Fisheries, and Veterinary (3)
Medium (3-4)	Information and Communication Technologies (4)	Business, Administration, and Law (3)	Arts and Humanities (3)	Natural Sciences, Mathematics and Statistics (4)	Business, Administration, and Law (3)
			Business, Administration, and Law (3)	Engineering, Manufacturing, and Construction (3)	
	Engineering, Manufacturing, and Construction (4)	Natural Sciences, Mathematics and Statistics (3)	Information and Communication Technologies (3)	Business, Administration, and Law (3)	Engineering, Manufacturing, and Construction (3)
	Business, Administration, and Law (3)			Agriculture, Forestry, Fisheries, and Veterinary (3)	
	Education (3)			Health and Welfare (3)	
Low (0-2)		Arts and Humanities (2)	Agriculture, Forestry, Fisheries, and Veterinary (2)	Arts and Humanities (2)	
			Social Sciences, Journalism and Information (2)		Arts and Humanities (2)
		Education (2)	Education (1)		Education (2)
			Engineering, Manufacturing, and Construction (1)		

In the UK, it was found that 72% of paid advertisements in Journalism and Information were from mills – the highest recorded percentage for paid results.

Canada had the least number of total paid results found, at 1056, where as Australia, the UK, and the US had 1414, 1473, and 1634 respectively. Of these, 53, 61, 59, and 58% of adverts were mills, respectively.

Table 12 shows a list of the top 10 most found essay mills with 'au' in the URL, for the purpose of identifying some of the Australian-based essay mills, whose operation was deemed illegal since the 3rd of September 2020 – the day before data collection took place. Two were also found in paid advertising: sameday-essay-au.com and myaussietutor.com.

Table 12. List of the 10 most frequently found essay mills with 'au' in the URL

Ranking	Mill	# of Times Found
1	goassignmenthelp.com.au	109
2	instantassignmenthelp.com.au	109
3	sameday-essay-au.com	76
4	australianhelp.com	73
5	myassignmenthelpau.com	68
6	au.edubirdie.com	65
7	essayontime.com.au	61
8	globalassignmenthelp.com.au	55
9	assignmenthelps.com.au	54
10	assignmenthelpnow.com.au	32

Discussion

Out of the countries studied in this paper, the UK is the most affected in terms of mean mill percentage and Canada the least, though the percentages for each country ranges from 47 to 51%, a mere difference of 4%. The results show that contract cheating is an international problem.

Considering the scores shown in Table 10, which also accounts for the market saturation, it could perhaps be concluded that Australia is the most affected by contract cheating as it had scored a total of 38 points. No field of education scored lower than a 3 in AU, which indicates that all its fields have already been exploited. Natural Sciences, Mathematics and Statistics in Australia was also the only field out of all countries to score a 6 – the highest possible score – implying that there is very little space for further growth of the industry there.

Canada scored the only 1s in Table 10 also, in the fields of Education and Engineering, Manufacturing and Construction, which we can infer to mean that they are at high risk of further growth of the industry. Engineering, Manufacturing and Construction is especially so as it encompasses a large student base - 12% of Canada's student population. Canada scored the fewest points in total – 24 – which indicates that it is the least exploited country in this study.

Business, Administration and Law scored consistent 3s. While the results show that this field has the highest percentage of mills already present, the field comprises 19-31% of the student populations in the four countries, meaning that it scores low in market saturation. While the industry is already established here, there is still a high potential for further growth with the incentive of having large numbers of students to sell to.

Social Sciences, Journalism and Information and Health and Welfare scored mostly 5s across the board, indicating that these fields are already well exploited in most of the locations in this study. The former field encompasses 7-12% of students in those locations where it scored a 5. In Canada, however, Social Sciences, Journalism and Information is placed at high risk of further exploitation as the field holds 15% of its students and it scored a 2.

The figures for the industry in the field of Health and Welfare are high. This is especially true for a field in which a student's quality of qualification is arguably the most important, as an improper education could be the deciding factor between life and death for a patient. The US is especially at risk of this industry growing as there are 3,400,000 students in the field, and Health and Welfare in the US scored two points lower than in the other countries.

The only two fields that scored low internationally overall were Education and Arts and Humanities. This indicates that these two fields have potential for industry growth as they have not been exploited as much as the other fields. One reason could be due to the forms of assignment they use. Arts for example, often requires physical items such as paintings or sculptures to be submitted for assessment, and Education could require a portion of time spent teaching students at a physical location. It seems clear that physical assignments are harder to cheat in. Although it is difficult to make a direct comparison due to differences in the fields of education chosen for this study, the findings for Arts and Humanities in the UK are consistent with Lancaster's (2020) study which found that Creative Arts & Design was at risk.

Interestingly, only 44% of search results that included 'buy' as a term, such as 'buy medicine essay', were held by essay mills. In comparison to 'writing service', which had 78% of results belonging to mills, mills for 'buy' are listed at about half the rate. This could be an indication that Google's attempts to reduce essay mills' visibility on the 'buy' term, if any, have been significant, although only partially successful. The results also suggest that mills are targeting students looking for help as 1157 of the paid results for that term were identified as mills.

Conclusions

This paper has examined the extent of the contract cheating industry's reach in nine discipline areas and has found that contract cheating is an international problem that affects all fields. The study has identified several fields of education where the risk of further exploitation is high and those that have already been exploited the most in four international locations.

In total, 3247 out of 5586 paid advertisements found were found to be from essay mills. This is in violation of Google's policy at the time of data collection which list 'paper-writing or exam-taking services' as a product or service that is not allowed to be advertised. 9 out of 10 results were mills for searches that had no subject specified, such as 'essay writing service'. This shows just how accessible contract cheating opportunities can be to students who wish to cheat.

During the data exploration phase, the researchers noted many seemingly deceptive techniques used by the contract cheating industry. Review sites provide links directly to essay mills. Contract cheating providers can themselves set up review sites that redirect to multiple essay mills that they themselves own.

The study also identified how contract cheating providers were exploiting vulnerabilities in websites seemingly unrelated to contract cheating. Table 13 shows examples of potentially innocent URLs that redirected to essay mills, most likely through the malicious technique of DNS hijacking. This suggests that marketing techniques used by some essay mills may not be completely above board.

Table 13. Example websites in the data collected that are appear to be victims of DNS hijacking

Domain	Hijacked URLs	Mill it Redirects to
bmmagazine.co.uk	/business/how-to-choose-a-website-to-buy-an-assignment-for-college-students/	assignmentjunkie.co.uk
hambleside.co.uk	/?2367-essay-master-thesis-database-uk	speedypaper.com
www.damers.dorset.sch.uk	/methods-of-teaching-essay-writing	quickcheapessay.com
stmgaparish.org	/uncategorized/76666352	
hennapromasterclass.com	/master-thesis-social-sciences	
workplacesuicideprevention.com	/english-coursework-essays	
moscowtime24.com	/best-cheap-essay-writing-service	essayoneday.com

Many commentators have considered that, although all types of assessments are cheatable given time, motivation and money, there can be assignment types where students are better placed completing work for themselves. This came through again in this study where presentation solutions are seen the lowest advertised supply out of the assignment types chosen. The nature of presentations and the needs for students to be able to answer questions may make outsourcing the production of presentation slides less desirable for students.

Challenges to academic integrity continue to develop. The availability of generative artificial intelligence may provide further opportunities for misuse by both students and the contract cheating industry, as well as allow providers to set up further advertising platforms at scale, exploiting less competitive search terms used by students. Legislative measures to restrict the advertising of essay mills have begun to be used in some countries, but these do not yet appear to have been fully successful. A repeated version of this study could examine how contract cheating marketing has developed over time, as well as perhaps consider the reach of providers in languages other English, an area that is also easier with the availability of generative AI and automated translation. Educators and academic institutions are advised to continue to be alert to how easily students can access information about contract cheating and to consider ways to mitigate the risks of students being exposed to commercial offers to complete their assessed work for them.

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