



## Research article

## Exam cheating and academic integrity breaches during the COVID-19 pandemic: An analysis of internet search activity in Spain

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## ABSTRACT

Academic institutions worldwide have had to adapt their methods of teaching and assessment due to COVID-19. In many Spanish universities exams moved online, affording students with opportunities to breach academic integrity that were not previously available to them. This paper uses the emerging research method of search engine data analysis to investigate the extent of requests for exam cheating information in Spain in the time period surrounding adjustments for the pandemic. The Internet data analytics technique is one that the paper proposes should be used more widely as an academic integrity research method.

For this study, search engine activity data on exam cheating in Spain was collected and analysed for the five-year period between 2016 and 2020 inclusive. The data suggests that students are searching for information about ways to cheat in exams, including how to create cheat sheets. Most strikingly, the results show a significant increase in requests for information on cheating on online exams during the COVID-19 timeframe and the Spanish lockdown period. Based on the findings, academic institutions in other regions should be wary about the opportunities that their students have to commit exam fraud.

## 1. Introduction

The COVID-19 pandemic has seen an international movement towards online teaching and assessment. The move online has often been completed at short notice and with little opportunity for plans to be put into place to ensure that academic integrity is preserved. Many default assessment methods are used to allow instructors to evaluate the competencies, skills and knowledge of students, including holding examinations and requiring students to write papers (Stiggins, 2017; Wiggins, 2011). The results obtained by students during these assessments can be crucial to their future lives and careers, determining both their economic status and their position in society (Fontaine et al., 2020).

The nature of assessment is such that, whether it is held in person or online, students have a personal incentive to try and obtain the best grades that they can. This means that some may resort to using unfair means, or as the academic integrity literature may declare this, they may act with academic dishonesty or commit academic misconduct. In other situations, such integrity breaches may be labelled as cheating or fraud.

Student cheating is not a new phenomenon. Comas et al. (2011) discuss a wide range of methods that students can use to get an unethical advantage over their peers, including using cheat sheets, copying from

classmates during written tests, committing plagiarism and falsifying data (Comas et al., 2011). Students taking exams have revealed a more recent tendency to hire external contacts to secretly communicate answers to them (Lancaster et al., 2019).

This paper focuses specifically on the student interest in cheating in exams during the COVID-19 pandemic, an area in which it has been observed that an increasing number of students are contract cheating and requesting exam answers (Lancaster and Cotarlan, 2021). Two novel contributions are made to the academic integrity literature. First, the study focuses on academic integrity in Spain, an area that has been little explored. Second, the emerging research technique of search engine analytics is used to conduct the study, suggesting a method that could be more widely applied to academic integrity research in the future.

## 2. Background

## 2.1. Academic integrity and the pandemic

The word pandemic is not a new word when considered in relation to the academic integrity situation. Authors have previously expressed concern that fraudulent practices are widespread when assessment is

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considered (Baran and Jonason, 2020; Brown and McInerney, 2008; Josien et al., 2015). This could already be said to represent a pandemic at the global level. Others commentators have suggested that academic misconduct is becoming a normative behaviour among students (Jensen et al., 2002).

When assessment processes cannot be trusted to provide accurate results, this can pose a challenge to the validity of qualifications and the credibility of certificates and degrees (Goff et al., 2020; Martin, 2017). An associated risk can see the trust that society has in academic institutions being called into question.

There is a relationship between academic dishonesty and professional dishonesty. As studies such as those of Nonis and Swift (2001), Carpenter et al. (2004) and Guerrero-Dib et al. (2020) show, students who have acted fraudulently in academic environments are more likely, in the future, to carry out dishonest behaviours in their professional workplace.

Moreno (1999) has suggested that educational institutions are the first test bed of corruption and dishonest behaviour. This is particularly relevant in the context of COVID-19, where many institutions have been forced to adopt didactic models based on distance teaching and online student assessments (Crawford et al., 2020; Raje and Stitzel, 2020; White, 2020). In some cases, students have been required to take tests and exams online in an environment which is not supervised and where it is difficult to verify that the student is completing the assessment of their abilities without resorting to unfair means.

Studies about the integrity of online assessments may be less developed than those relating to face-to-face assessments, but indications that online assessments pose high risks to academic integrity are beginning to emerge. The academic publisher Willey (2020) surveyed almost 800 university teachers from around the world and found that 93% of participants believed that students have more opportunities to cheat on online assessments and that this problem has never been as severe as during the COVID-19 pandemic.

Literature reviews such as the one conducted by Chen et al. (2020) show that academic dishonesty in online teaching models is widespread and that the factors that cause it are related to components such as personality, cognitive aspects and teaching styles. A further review (Butler-Henderson and Crawford, 2020) confirms that the topic of assessment test fraud is the most addressed in the literature on online assessments. Its prevalence, as Sullivan (2016) has shown, is at an alarming level. In this regard, there is the suggestion that the online assessment environment has more drawbacks than the classroom environment for students and teachers (Hobsons, 2021; Joshi et al., 2020). It also appears to offer greater facilitation for cheating (Fask et al., 2014).

Although online proctoring of remote exams is possible, an early study of academic integrity during COVID-19 has shown that shown that this can be detrimental to students' mental health (Eaton and Turner, 2020). Online proctoring does not seem to have been widely adopted across the sector as a solution for preventing misconduct. Amzalag et al. (2021) also warn about a growing mistrust between students and instructors during this time.

## 2.2. The Spain context

The study of academic integrity in Spain, the geographical scope of this paper, does not have a tradition as established as that of the Anglo-Saxon environment or central and northern Europe (Comas, 2009). Regarding studies that focus on dishonest student behaviours seen in the course of them taking exams, the work that can be cited is very scarce.

A study focused on nursing students (Blanch-Mur et al., 2006) showed that 28% of students claimed to have copied during an exam. Data from a second study, based on a sample of Spanish university students, show that approximately 45% of students claimed to have used cheat sheets and material not allowed during exams (Sureda-Negre et al., 2009). A later study carried out by the same group of researchers, found that almost 50% of university students reported having copied at least once during a face-to-face exam (Comas et al., 2011).

A Spanish panel of experts, stated that the most serious dishonest behaviours that university students can commit on their assessments were: impersonating another person on an assessment; stealing tests or exams, manipulating their grades and changing them for others; obtaining exam or assessment questions before taking an exam; turning in an exam taken by another student as one's own; cheating on a face-to-face exam through technological devices, such as mobile phones and earpieces, then, finally, presenting work by another student as their own (Sureda-Negre et al., 2020). The relationship and assessment of dishonest behaviours show the concern about exam fraud by the group of participating experts.

The adaptation of the Spanish university education system to the context caused by the pandemic has led, among other developments, to an increase in concerns about exam fraud. Such concern has resulted in the development of guidelines and recommendations by political and academic authorities on non-face-to-face assessment procedures (Confederación General de Política Universitaria, 2020; CRUE, 2020; Ministerio de Universidades, 2020). In the Conference of Rectors of Spanish Universities (Conferencia de Rectores de las Universidades Españolas - CRUE) guideline, there is no explicit reference to cheating on exams, but on up to twenty occasions, the word "security" appears, with honesty being one of its fundamental dimensions. Specifically, the following is stated:

Other important aspects to consider are measures to preserve academic integrity and the use of available legal mechanisms (expulsion from the test, qualification of suspension or, where appropriate, institution of disciplinary proceedings) in the case of fraudulent tests or assignments (CRUE, 2020, p. 5, p. 5).

In a handbook prepared by the Ministerio de Universidades (Ministry of Universities), a section is dedicated to presenting recommendations to avoid the use of fraudulent means and another to presenting systems to guarantee the authorship of exams (Ministerio de Universidades, 2020).

The handbook of recommendations developed by the Group of Online Teaching Authorities of the Public Universities of Castilla y León is worth noting (García-Peñalvo et al., 2020). Among its recommendations are detecting impersonation throughout an exam as a requirement that can be requested from an e-proctoring system, blocking the browser of the examinee so that they cannot access content outside the exam, detecting elements other than those necessary to perform a test; and, finally, encouraging the obtainment of objective evidence about the completion of exams by students without help or collaboration from third parties.

Concern about the issue of fraud on online exams in the context of COVID-19 is also reflected in the media in Spain, echoing numerous cases of fraud on online assessments during 2020 (Alías, 2020; Asensio, 2021; García, 2020; Ortega, 2020; Peiro, 2020). In most of these journalistic articles, online assessments have been presented with a negative viewpoint due to the potential ease of fraud. In the opinion of Goberna, a Professor of Mathematics at the University of Alicante, "Online exams are a scam; they will basically cheat" (Bueno, 2021). A Professor of Italian Philology at the University of Oviedo, de Sande, maintains a similar position stating "With the telematic exams, you give away the course" (Rodríguez, 2021).

A final indicator of the extent of the phenomenon of fraud on assessments in the COVID-19 context can be obtained by searching YouTube with the descriptor "copiar examen online" ("cheat online exam"). A large number of videos are found in which experiences of cheating on exams are related to direct titles, such as "Ayudo a mi hermana a copiar en un examen online!" ("I help my sister cheat in an online exam!"), which gained over 3.7 million views in under nine months (YoSoyPlex, 2020), and others openly give advice on cheating on online assessments, such as "Cómo saber las respuestas de un examen online" ("How to know the answers to an online exam"), which accumulated nearly 850,000 views from April 2020 to February 2021 (SPOTTWAIS XD, 2020).

Considering the above, the relevance of obtaining new knowledge about exam fraud in the COVID-19 era is clear. This study addresses the issue from a perspective rarely used until now, namely data analysis from Internet searches or search analytics.

### 3. Objectives

This study addresses the issue of exam misconduct in the scenario that occurred in Spanish universities due to COVID-19. It does so by aiming to provide evidence that improves the knowledge about dishonest behaviours available to students during the pandemic. The study is based on the hypothesis that interest in exam fraud has experienced a substantial boom during the COVID-19 crisis and that this increase is reflected in Internet searches. Thus, the following objectives are provided:

- To identify, analyse and classify the descriptors used in the Internet searches carried out in Spain about cheating on exams in 2020;
- To analyse the volume of activity and the search trends for descriptors related to cheating on exams in Spain in 2020; and
- To compare the trends for and volume of Internet searches about cheating on exams in Spain between 2016-2019 and 2020.

### 4. Methodology

#### 4.1. Methodological underpinning

The study presented in this paper uses search engine analytics (Walcott et al., 2011) or web log analysis (Jansen and Spink, 2006) as the basis for a methodological analysis of academic dishonesty during the COVID-19 pandemic. This research approach is used to address many of the flaws that can be seen in other studies, examples of which are considered here.

The majority of research into academic integrity is based on experimental studies in which dishonest behaviours are analysed. Some examples include Beaussart et al. (2013) and Gino et al. (2009). Many studies are based on self-reported responses by the participants, for example Cronan et al. (2018) and Schwartz et al. (2013). Other research has been based on the analysis of detected cases of academic dishonesty as an indicator of its prevalence, an example of which is Thomas and Jeffers (2020).

Each of these approaches has its own limitations. For instance, experimental or quasi-laboratory investigations can be based on recreated situations that do not correspond to the real context and the practical consequences of the dishonest behaviour studied (Comas, 2009). Further, studies based on self-reported responses may be inaccurate or contaminated by social desirability bias (Fask et al., 2014; Lee et al., 2020).

There are also shortcomings in the work focused on the detection of fraud because not all examples of academic dishonesty are discovered. This can be seen in the contributions of Foltýnek et al. (2020), where the use of automatic plagiarism detection software can provide inaccurate measures of this malpractice, including both false positives and false negatives.

The study reported in this paper provides a novel way of addressing the methodological difficulties outlined above, namely the data analysis of queries in a search engine. It can be considered to complement existing research techniques used in academic integrity well.

The analysis of data from Internet searches is an expanding research method that has been used in various fields. First, it has been applied in medium-term forecasting studies. Some examples include the analysis of unemployment trends (Vicente et al., 2015), the analysis of consumer good preferences (Dimpfl and Jank, 2016), preferences between tourist destinations (Yang et al., 2015), in estimations of affluence to spaces or cultural and sports activities (Martínez et al., 2016), and in studies of electoral result predictions (Prado-Román et al., 2020). Second, it has been used in immediate prediction studies to allow obtaining relevant

information much earlier than through traditional data collection techniques (Fantazzini, 2014). Third, it has been used in studies detecting problems related to health (Clemente et al., 2019; Zhang et al., 2018), the environment (Funk and Rusowsky, 2014) and well-being (Arnold, 2020). Finally, it has been used for the measurement of complex processes where traditional data presents known deficits, for example, for international migration studies (Böhme et al., 2020).

Search engine analytics not been widely applied in academic integrity research, but has potential to improve knowledge within this field. There are some educational studies that analyse Internet searches of academic institutions to predict their recognition and reputation, for example Vaughan and Romero-Frías (2014), but they are tangential to the study presented here. One of the closest examples within the academic integrity field is the work by Daly (2020). This analysed the search engine optimisation techniques used by contract cheating websites, but the focus there was primarily on the provision of services rather than the demand for them. Following the conclusions of a study by Ginsberg et al. (2009) this paper argues that web search data can be used to track various social phenomena and provide more timely and updated information than can traditional data.

#### 4.2. Dataset formation

Two datasets were collected related to search terms used by students looking to cheat in exams. Data was gathered relating to exam cheating in general, as well as relating to specific requests to cheat in online exams. All of the data was restricted to searches from Spain.

##### 4.2.1. First dataset

The first dataset related to monthly search volumes in 2020 and was prepared using the “Keyboard magic tool” function within the SEMrush software application. This allowed the exploration of organic search terms used in the Google search engine.

Two initial search terms in Spanish were applied. The descriptor “copiar examen” (“cheat exam”) was used to generate a list of 140 keywords. The keyword “chuletas examen” (“test cheat sheets”) generated a second list of 127 keywords. This list was manually filtered to remove duplicates ( $n = 73$ ) and keywords not related to cheating in exams ( $n = 100$ ), leaving 94 keywords for the first dataset.

For each of the 94 keywords, two measures were collected for each month between January and December 2020:

- 1) The average monthly volume of Google searches for each keyword throughout 2020
- 2) Trend data that measures the interest in the determined keyword during each month between January and December 2020. This is scaled by SEMrush between 0 and 1 based on the changes in the number of searches per month.

##### 4.2.2. Second dataset

For the second dataset, figures were obtained through Google Trends related to longer term search figures between 2016 and 2020. This data was collected on a weekly basis. For this dataset, the searches in Spanish “copiar examen” (“cheat exam”), “chuletas examen” (“exam cheat sheets”), “copiar examen online” (“cheat online exam”) and “copiar online” (“cheat online”) were applied.

The Google Trends results are provided in a scaled format, with all values given between 0 and 100. 100 indicates the week with the highest frequency of searches between 2016 and 2020 in proportion to the total number of searches performed in Spain.

Two further examples are useful to indicate how the Google Trends data works.

The value of 50 indicates the weeks where the popularity of the term is half that of the maximum value.

The value of 0 represents the case where the search numbers were too low to provide enough data for the calculation.

4.2.3. Data processing

The process and data analysis were carried out using the statistical analysis programme SPSS V.20. The following statistical tests were used: frequency analysis, Student's t-test to compare means and one-way ANOVA.

5. Results

5.1. Exam cheating search descriptors and volumes

Table 1 shows a high-level analysis of the 94 organic search keywords from the first dataset, grouped by the volume of searches. The total number of searches generated by the set of descriptors considered represents an average of almost 35,000 monthly searches in Spain, resulting in an annual volume close to 420,000 searches on this topic for 2020. The search for cheat sheet related terms are prominent in the dataset.

The 94 keywords were coded into five categories, classifying and counting the types of searches performed. As shown in Table 2, the highest percentage (40.4%) was focused on locating information about how to cheat. The second group of most frequent searches (26.6%) was focused on generic concepts, while the other three refer, in this order, to searches for information about devices, electronic and non-electronic, and applications, programmes and webpages to cheat on exams.

In a second level of analysis, keywords were classified into two large blocks: searches related to cheating on online exams and searches related to cheating on exams in general. A total of 27.7% of the keywords identified searches for information related to online test fraud, while 73.3% were searches related to cheating on tests in general.

5.2. Monthly search trends

The 2020 exam cheating monthly keyword search trends for Spain were established from the first dataset. The cumulative results are shown in Figure 1, which demonstrates that December, April and March 2020, in this order, were the months with the highest search volume. The lowest volumes occurred in September, August and January 2020.

The monthly trends for keywords based on cheating on online exams were compared with those based on cheating in general. Student's t-test was applied. The results are shown in Table 3.

As Table 3 demonstrates, until May 2020, the search trend for keywords related to cheating on exams in general was higher than the trend for searches related to cheating on online tests, while in the months of May to July, the trend was reversed. The search trend for keywords related to cheating on exams in general in the last five months of the year was again higher. These differences were statistically significant for the March, April, May, June, July, November and December data.

5.3. Search trends between 2016 and 2020

The second dataset, containing data collected weekly between January 2016 and December 2020 and relating to general and online forms of exam cheating, was analysed. A one-way ANOVA test was used to assess the presence of significant differences among the annual means of searches for four keywords. Two keywords related to cheating on online exams ("Copiar online" ("Cheat online") and "Copiar examen online" ("Cheat online exam")) and two related to cheating on exams in general ("Copiar examen" ("Cheat exam") and "Chuletas examen" ("Exam cheat sheets")). The results are shown in Table 4 (see Table 5).

As the data shown in Table 4 indicates, searches for exam cheating related terms increased substantially each year between 2016 and 2020, peaking in 2020. The search for "Copiar examen" ("Cheat exam"), showed high levels of interest in 2016 and 2020.

To calculate the difference between the searches performed during 2020, a year including the COVID-19 pandemic period, and the previous 4 years, the means for 2020 and the 2016–2019 period were compared using Student's t-test. There were significant differences in three of the

four keywords analysed. The search interest for the descriptors "Copiar online" ("Cheat online"), "Copiar examen online" ("Cheat exam online") and "Copiar examen" ("Cheat exam") was significantly higher in 2020 than in previous years.

5.4. Searches during COVID-19 lockdown

A final study using the second dataset aimed to investigate the interest in exam cheating throughout 2020, comparing the period when the Spanish population was under lockdown with the remainder of the year. The lockdown period lasted for 15 weeks between March 14 and June 21.

Table 1. List of analysed keywords and monthly search volume.

Keywords	Monthly search volume throughout 2020 (12-month average)
chuletator	12100
Tipp-Ex cheat sheet	8100
how to cheat on an online exam	1900
cheat sheets	880
how to cheat on an exam	720
cheat on an exam/template Tipp-Ex cheat sheet	590
cheat sheets/how to cheat on a Moodle test	480
how to cheat on an online exam	390
avex uned cheating/how to make cheat sheets for an exam/how to know the answers of an online test	320
cheat sheets online/cheat sheet watch	260
cheat sheets for Tipp-Ex/chuletator net/the chuletator	210
cheat sheet pen/hack online exam/cheat on an online exam/how to know the answers of an online exam/Tipp-Ex cheat sheet/Tipp-Ex chuletator	170
101 cheat sheets for exams/how to make cheat sheets for an exam/how to cheat on an exam with a cell phone/cheat sheets cheat/cheat sheet pen/cheat sheet pen	140
chuletator exam cheat sheets online/tricks to cheat on an exam/hack Moodle exam/ways to cheat on an exam/how to cheat on an expert level exam	110
100 ways to cheat on an exam/applications to cheat exams/easy and effective cheat sheets/cheat sheets to cheat/how to cheat on an exam/how to cheat on a chemistry exam/how to make cheat sheets without being caught/how to know the answers of an exam on line/cheat with your cell phone on an exam/where to sit to cheat during an exam/the best cheat sheets to avoid being caught/ways to cheat with your cell phone/best cheat sheets/best cheat sheets to cheat/page to make cheat sheets for exams/earpiece pen	90
10 ways to cheat on an exam/app to make cheat sheets/articles to cheat on exams/cheat sheets for exams/cheat sheets for math exams/how to cheat on a September exam/how to cheat on an exam without them noticing/how to do cheat sheets for an exam without getting caught/how to make the best cheat sheets/cheat with your cell phone without getting caught/cheat with earpiece/where to hide cheat sheets/ways to cheat on an exam/the best exam cheats/best ways to cheat on an exam/cheat pages/tactics to cheat on an exam/tricks to cheat with earpiece	70
applications for cheat sheets/cheat sheets original exams/original cheat sheets/how to cheat with your cell phone without being caught/how to cheat on an exam without getting caught/how to make cheat sheets without being caught by the teacher/how to make the best cheat sheets for exams/how to make cheat sheets in the front row/where to make cheat sheets for exams/ways to cheat/ways to cheat on an exam with a mobile phone/tricks to make cheat sheets for an exam	50
articles to cheat exams/water bottle cheat sheet/school cheat sheets/electronic exam cheat sheets/cheat sheets to cheat without getting caught/cheat on an exam with headphones/where to hide exam cheat sheets/ways to make exam cheat sheets/ways to make cheat sheets without getting caught/lenses to cheat on exams	40
<b>Total</b>	<b>34750</b>

**Table 2.** Search categories based on the analysed keywords.

Categories	Examples of keywords	Percentages
1. How to cheat	“How to cheat on an online exam”, “how to cheat on an exam”, “how to cheat on an exam with a cell phone”	40.4%
2. Generic concepts about cheating	“Exam cheat sheets”, “cheat on an exam”, “101 exam cheat sheets”	26.6%
3. On electronic devices for cheating	“Cheat with a cell phone on an exam”, “cheat sheet watch”, “cheat with a cell phone”	12.8%
4. On non-electronic devices for exam cheating	“Lenses to cheat on exams”, “water bottle cheat sheet”, “Tipp-Ex cheat sheet”	10.6%
5. Applications, programs and pages to cheat	“Chuletator”, “app to make cheat sheets”, “cheat sheets pages”	9.6%

The remainder of the year, 37 weeks, comprised the non-lockdown period.

Table 6 shows a comparison of mean weekly search volumes for the four keywords over the lockdown and non-lockdown period. Student's t-test was applied.

The results from Table 6 show the existence of significant differences in the search volumes for the selected keywords: during the lockdown. The search trends for the keywords “Copiar online” (“Cheat online”) (average interest, 63 points during lockdown versus 12 points during non-lockdown), “Copiar examen online” (“Cheat online exam”) (search interest, 42 points during lockdown versus three points during non-lockdown) and “Copiar examen” (“Cheat exam”) (search interest, 48 points during lockdown and 13 points during non-lockdown) were significantly higher than those during the non-lockdown period.

**6. Limitations, discussion and conclusions**

The data presented in this paper has shown an increase in interest in exam cheating in Spain which aligns with the period of the COVID-19 pandemic. This matches research that has been conducted using other methodologies, but which has focused mainly on exam cheating in English (Lancaster and Cotarlan, 2021), thus suggesting that online exams in all languages are susceptible to breaches of academic integrity.

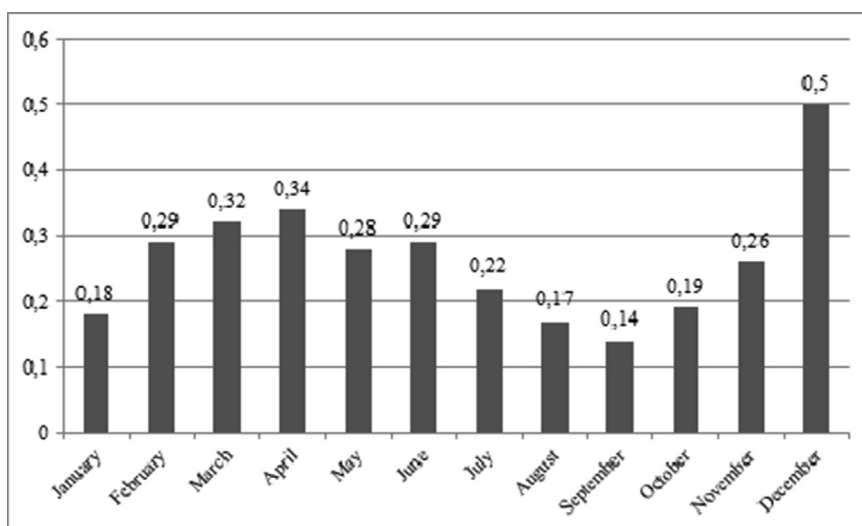
The research presented has relied on Internet search metrics. These provide valuable information on the interests on Internet users and can be used to predict population behaviour, but some limitations of this

**Table 3.** Comparison of monthly trends for the keywords analysed with SEMrush based on searches related to cheating on exams in general vs. cheating on online exams.

Month	Keywords related to cheating in tests	Average	Standard deviation	Bilateral significance
Jan-20	General	0.191	0.044	0.607
	Online	0.149	0.063	0.588
Feb-20	General	0.307	0.036	0.441
	Online	0.251	0.069	0.475
Mar-20	General	0.376	0.039	0.010*
	Online	0.188	0.050	0.005*
Apr-20	General	0.393	0.039	0.035*
	Online	0.235	0.058	0.030*
May-20	General	0.246	0.038	0.045*
	Online	0.402	0.072	0.064
Jun-20	General	0.190	0.033	0.000*
	Online	0.554	0.079	0.000*
Jul-20	General	0.179	0.030	0.004*
	Online	0.362	0.062	0.012*
Aug-20	General	0.182	0.037	0.863
	Online	0.170	0.042	0.841
Sep-20	General	0.151	0.029	0.758
	Online	0.133	0.051	0.766
Oct-20	General	0.2050	0.034	0.492
	Online	0.163	0.035	0.403
Nov-20	General	0.309	0.032	0.018*
	Online	0.154	0.041	0.005*
Dec-20	General	0.599	0.049	0.000*
	Online	0.243	0.049	0.000*

\* Significant at p < 0.05 level.

methodology should be noted. The largest limitation is that available data is anonymised, and therefore, there is no certainty about who is behind each search. This study identified approximately 400,000 annual searches in Spain related to cheating on exams, but there is no certainty that these were all conducted by students. The analysis also rely on trust of the data supplied by SEMrush and Google Trends. It could be argued



**Figure 1.** Monthly search trends for the set of keywords during 2020.

**Table 4.** Comparison of 2016–2020 annual means of weekly searches for the keywords analysed, based on data from Google Trends.

Keywords	Year	Average search interest	Standard deviation	Bilateral significance
Cheat online	2016	8.58	1.399	0.000*
	2017	8.57	1.436	
	2018	9.75	1.487	
	2019	13.4	1.329	
	2020	27.37	4.065	
	Total	13.51	1.076	
Cheat exam online	2016	0.00	0.00	0.000*
	2017	0.00	0.00	
	2018	0.31	0.30	
	2019	0.00	0.00	
	2020	14.44	3.67	
	Total	2.94	0.81	
Cheat exam	2016	19.71	2.65	0.006*
	2017	13.11	1.95	
	2018	14.12	1.93	
	2019	13.40	1.69	
	2020	23.58	3.48	
	Total	16.77	1.10	
Cheat sheets exam	2016	22.94	4.19	0.070
	2017	11.68	2.54	
	2018	13.92	3.19	
	2019	11.73	2.37	
	2020	14.52	3.05	
	Total	14.95	1.41	

\* Significant at  $p < 0.05$  level.

that this is an indirect measure, but so is the predominant approach based on responses to questionnaires.

The Internet is central to the lives of everyone involved in education and beyond. It has become an important source of information for tracking and monitoring activities that take place online. In this context, the data related to internet searches is especially important as this reflects the “needs, wants, interest, and concerns” of people (Ettredge et al., 2005, p. 87). It has the potential to help improve the knowledge of human behaviour.

Using Internet search metrics has great value for research into academic integrity and education in general. This data describes what a population does when they think they are “alone” looking for information for their particular use (Orduña-Malea, 2019). For sensitive research, such as the data presented here on exam misconduct, search engine analytics are suitable to both expand upon and complement existing evidence and methodologies.

**Table 5.** Comparison of mean search interest figures in 2020 and in the 2016–2019 period for the keywords analysed, based on data from Google Trends.

Keywords		Average search interest	Standard deviation	Bilateral significance
Cheat online	2016–2019	10.07	0.71	0.000*
	2020	27.37	4.06	0.000*
Cheat exam online	2016–2019	0.080	0.07	0.000*
	2020	14.44	3.67	0.000*
Cheat exam	2016–2019	15.08	1.05	0.002*
	2020	23.58	3.48	0.023*
Cheat sheets exam	2016–2019	15.05	1.59	0.881
	2020	14.52	3.05	0.877

\* Significant at  $p < 0.05$  level.

**Table 6.** Comparison of weekly means of searches for keywords analysed for 2020 (period of lockdown vs. non-lockdown), based on data from Google Trends.

Keywords		Average search interest	Standard deviation	Bilateral significance
Cheat online	Non-lockdown	12.70	1.967	0.000*
	Lockdown	63.53	7.269	
Cheat exam online	Non-lockdown	3.24	1.560	0.000*
	Lockdown	42.07	8.875	
Cheat exam	Non-lockdown	13.30	2.071	0.002*
	Lockdown	48.93	7.822	
Cheat sheets exam	Non-lockdown	17.57	4.070	0.118
	Lockdown	7.00	2.648	

Another limitation of the study is related to methodological issues; what have been detected with the methodology used are interests and trends about cheating practices during exams, but not the practices themselves. In the present study we are working on the basis of analysing a scenario of pre-conduct: we can estimate the level of interest on cheating in exams, but we cannot estimate the real number of cheating behaviours carried out, which is a very complex topic that has generated long discussions and arguments between researchers due to the intrinsic characteristics of the phenomenon analysed and the evident desirability bias that has (Winrow et al., 2015).

The services used as data sources for this paper could also be useful for monitoring academic misconduct and predicting how this could develop in the future. Through Google Trends, for example, it should be possible to establish warning signs about new types of dishonest behaviours within weeks of discussion of such behaviours emerging. This would allow educational institutions to put early academic integrity interventions into place. Such monitoring and trend prediction could even take place on a regional or national level.

Most importantly, this paper has confirmed that Spain has not been immune to the academic integrity implications of the COVID-19 pandemic. The data presented has shown a significant increase in Internet searches for cheating on exams, especially on online exams.

This phenomenon was verified, first, through the volume of organic searches carried out in Spain in 2020 with keywords associated with “copiar en pruebas de evaluación” (“cheat on assessment tests”), which was very high (420,000). This magnitude can be better calibrated when compared with other descriptors associated with exams, such as “técnicas de estudio” (“study techniques”), whose annual search volume in 2020, based on SEMrush data, was approximately 152,000 in Spain.

Furthermore, the data obtained show that this interest in cheating on exams had been directed towards those taken online. Compared with previous years, the increase in such interest was significant. This trend is considered to be intimately related to the fact that during the pandemic, a large part of educational activities in Spain, including assessments, were virtual.

To be able to more accurately calibrate the relationship between interest in cheating on online exams and the educational context caused by the pandemic, it would be instructive to monitor the evolution of trends and search volumes in the coming years. Given the ease of access and processing of data from almost any country in the world, it would also be useful to perform international comparative analyses. This would allow a clearer snapshot to be obtained of what happens at the international level in relation to fraud in assessment processes in the context of the pandemic and the massive adoption of online assessment procedures. Unfortunately, the data provided in this study on Spain hints at an unflattering scenario for academic integrity.

It would be interesting, for the future, analysing and comparing the data gathered in our study with data generated by studies on the same

topic carried out using other methodologies during the outbreak so as to be able to measuring the correlation between different data series and estimating the validity of the method used in our study.

## Declarations

### Author contribution statement

Rubén Comas-Forgas, Thomas Lancaster, Aina Calvo-Sastre and Jaume Sureda-Negre: Conceived and designed the experiments; Performed the experiments; Analyzed and interpreted the data; Contributed reagents, materials, analysis tools or data; Wrote the paper.

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### Data availability statement

Data will be made available on request.

### Declaration of interests statement

The authors declare no conflict of interest.

### Additional information

No additional information is available for this paper.

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