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ISSN - 1982-6109
REVISTA CIENTÍFICA DE EDUCAÇÃO A DISTÂNCIA

THE IMPACT OF COVID-19 ON UNIVERSITY EDUCATION IN PORTUGAL: INSIGHTS FROM STUDENTS AND TEACHERS

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DOI: 10.5281/zenodo.10674337

ABSTRACT

The COVID-19 pandemic become a critical challenge for the higher education sector worldwide and in Portugal. Under such a circumstance, the exploration of the capacity of this sector to react and adapt to such a state of uncertainty has become more of huge importance. In this investigation, we critically reflect on the Portuguese teaching experience during the early COVID-19 lockdown in this country. This is an exploratory study based on a qualitative approach with an aim to reflect about new practices of teaching under a pandemic emergency. Based on such experience in Portugal regarding online teaching, we explored perspectives from two different groups (a) 188 teachers and (b) 1.859 students who experienced such online environment teaching, the challenges arising from online teaching, and, in fact, if online methods influenced or not the results obtained by students. Results show a consistency between the two previous samples, clearly demonstrating that the online experience implemented during the pandemic was satisfactory both to teachers and students. The main pit fall on online environment was the lack of socialization and evaluation system while the main strength of such teaching method was the saved time on travelling. Finally, there was no evidence that online evaluation had a significative influence on the final results by students.

Keywords: Covid-19, Portugal, teaching methods

1. Introduction

The COVID-19 pandemic has presented a range of unparalleled challenges across various sectors of society, including education (Flores et al., 2022). University education in Portugal has

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likewise experienced significant disruptions, undergoing profound and unforeseen transformations (Viana et al., 2023). The sudden shift to remote learning and the implementation of containment measures to curb the virus's transmission have had far-reaching consequences on the education system, impacting students and teachers alike (Adedoyin & Soykan, 2023).

The sudden transition to remote learning necessitated swift adaptation and self-directed skills, which significantly impacted motivation to learn and academic performance (La Velle et al., 2020). The absence of face-to-face interaction with peers and teachers, coupled with social isolation, adversely affected students' emotional and social well-being (Hermanto & Srimulyani, 2021). Similarly, educators encountered comparable challenges, requiring rapid adjustment to online teaching methods and the exploration of effective means to engage students remotely (Adnan & Anwar, 2020). The utilization of virtual platforms necessitated the acquisition of new technological skills and the reevaluation of teaching methodologies (Adnan & Anwar, 2020). Moreover, the lack of physical contact with students and the difficulty in accurately assessing their progress posed significant obstacles for teachers (Hill & Fitzgerald, 2020).

This research aimed to obtain a comprehensive understanding of the impact of COVID-19 on university education in Portugal by analyzing the perspectives of both students and teachers. Grasping the challenges encountered and the solutions devised is crucial for enhancing educational systems and readying ourselves for potential future crises, thereby guaranteeing quality and accessible education for all.

2. Literature Review

Covid's impact on higher education

The COVID-19 pandemic has brought about a significant transformation in the global higher education landscape (Adnan & Anwar, 2020). In response to the rapid emergence and spread of the virus, various public health measures, such as movement restrictions and social distancing, were implemented to curb its transmission (Adedoyin & Soykan, 2023). These measures have had a profound impact on higher education institutions, affecting students, faculty, and the overall academic environment. As a result, remote learning has emerged as a primary response to the restrictions imposed by COVID-19 (Turnbull et al., 2021). Higher

education institutions faced the challenge of swiftly adopting online teaching methodologies, transitioning from the traditional face-to-face model to the virtual environment. This shift necessitated students and teachers adapting to new learning platforms, digital communication tools, and remote teaching methods (Sari & Nayır, 2020).

The transition to online education has had an impact on both students and teachers (Mendoza-Jimenez et al., 2023). Students have encountered difficulties accessing technology and the internet, resulting in disparities in educational opportunities (Heeks, 2020). The absence of face-to-face interaction and the sense of social isolation may have adversely affected students' engagement, motivation, and subsequently their academic performance (Hill & Fitzgerald, 2020). Teachers have had to quickly adapt to the virtual learning environment, acquiring new technological skills and reimagining their pedagogical approaches for remote instruction (Turnbull et al., 2021). Additionally, assessing student progress has posed a challenge, requiring the adaptation of assessment methods to suit the online setting (Guangul et al., 2020).

When analyzing the impact of COVID-19 on higher education, it is crucial to consider the measures adopted by institutions to mitigate these effects (Bryson & Andres, 2020). Institutions made investments in technological infrastructure, implemented training programs to enhance teacher skills, provided psychosocial support, and implemented digital inclusion policies (Turnbull et al., 2021). Another significant aspect to consider is the impact on the emotional well-being of both students and teachers. The pandemic has led to a significant increase in stress, anxiety, and emotional burden due to uncertainties and sudden changes (Vieira & Meirinhos, 2021). Consequently, several educational institutions had to develop and implement psychological support programs to assist individuals in coping with these challenges (Paudel, 2021).

Perspectives about online teaching: teachers versus students

Online education emerged as a response to the pandemic and elicited diverse opinions among teachers and learners (Maatuk et al., 2022). While some individuals recognized the benefits and opportunities that online education offers, others encountered significant challenges and had negative experiences (Flores et al., 2022). Many teachers found the transition to remote teaching to be a substantial challenge, as they had to quickly learn how to navigate new tools and

technologies, often without adequate training (Adnan & Anwar, 2020). Adapting teaching methodologies and materials to the virtual environment required additional time and effort, and the outcomes were not always as desired. While some educators felt empowered and enthusiastic about the possibilities offered by remote teaching, others struggled to adjust to this new form of instruction (Hermanto & Srimulyani, 2021). The lack of face-to-face contact made it challenging to establish emotional connections and comprehend the individual needs of learners (Almazova et al., 2020).

However, online teaching has been found to offer several benefits according to some educators. They have been able to leverage a range of digital resources and platforms, which have greatly enhanced their lessons (Heeks, 2020). Remote teaching has also provided greater flexibility in terms of scheduling, enabling teachers to balance their professional and personal responsibilities more effectively (Viana et al., 2023). Technology has opened up opportunities to reach a broader audience. The use of multimedia resources and asynchronous interaction has significantly enriched the educational experience (Chen et al., 2020). These resources have provided diverse content formats and facilitated the exchange of ideas, thereby enhancing student engagement and making learning more accessible and collaborative, even outside real-time sessions (Flores et al., 2022).

Distance learning poses several challenges for students (Adnan & Anwar, 2020). Adjusting to remote education necessitates self-discipline, organizational skills, and self-regulation. Many encountered difficulties in managing their time and staying motivated, particularly without the conventional learning framework and atmosphere (Almazova et al., 2020). Furthermore, socio-economic disparities and/or limited internet access proved to be significant hurdles in this regard (Rajab et al., 2020).

The absence of in-person interaction with peers and teachers was identified as a drawback since it limited networking, collaboration, and group discussions (Williams et al., 2023). Nevertheless, certain students acknowledged the advantages of online learning (Hermanto & Srimulyani, 2021). The flexibility of schedules allowed for a harmonious balance between studies and other obligations, such as work and/or family care. Furthermore, it facilitated access to supplementary digital materials and resources (e.g., recorded lectures), thereby offering novel avenues for learning and research (Turnbull et al., 2021).

It is important to highlight that teachers' and students' perspectives towards online teaching were influenced by several aspects, among which stand out the field of study, the level of education, and the conditions of access to technology (Oliveira et al., 2021). Understanding the different perspectives is key to improving the effectiveness of online teaching and ensuring a quality educational experience (Flores et al., 2022). Implementing strategies that promote student interaction and engagement, as well as providing technological and emotional support, is essential to maximizing the benefits and overcoming the challenges of distance learning in the future (Adedoyin & Soykan, 2023).

Strengths and weaknesses of online learning

Online learning has both strengths and weaknesses that can impact the educational experience (Yuhanna et al., 2020). According to Toquero (2020), one of its main advantages is the flexibility it offers in terms of time and location. Course content can be delivered and accessed at one's convenience, which is particularly beneficial for individuals with other responsibilities such as work commitments or family support. Almazova et al. (2020) further explain that online learning provides learners with access to a wide range of educational resources and materials, including videos, articles, e-books, and multimedia content. This availability of diverse resources enhances the learning experience and offers different approaches to understanding concepts.

Online learning platforms facilitate collaboration among students and teachers, even when they are geographically separated. Through features such as discussion forums and chat rooms, these platforms encourage the exchange of ideas and knowledge (Donitsa-Schmidta & Ramot, 2020). Distance learning promotes autonomy and self-discipline in the study process, allowing for the development of essential skills such as time management, planning, organization, and self-regulation. These skills are crucial both in academic pursuits and professional life (Viana et al., 2023).

Despite its strengths, online learning also has some disadvantages. The absence of physical contact not only limits social interaction and interpersonal relationships but also reduces opportunities for collaboration and networking (Maatuk et al., 2022). This can lead to feelings of isolation and dilution of responsibilities, which can negatively impact active participation and

dedication to studies. Moreover, the lack of adequate access to technology has created inequalities in education and hindered learners' full participation in many cases (Heeks, 2020). Online learning relies on a technological infrastructure that includes internet access, compatible devices, and basic technological skills, which may not be universally available across all socio-economic levels (Flores et al., 2022). Additionally, assessing learners' performance in a fair and credible manner poses a challenge in online learning. Academic integrity and fraud prevention require the implementation of effective monitoring strategies that can ensure the authenticity and quality of results (Viana et al., 2023).

In light of the aforementioned points, it is evident that online learning provides several advantages, such as flexibility, a wide range of innovative and diverse resources, and opportunities for virtual collaboration. However, it also brings forth certain challenges, including the absence of face-to-face interaction, issues with motivation, limited access to technology, and alternative assessment methods (Maatuk et al., 2022). Striking a balance between these strengths and weaknesses is crucial to delivering a high-quality educational experience and addressing the requirements of both students and edu.

3. Materials, Method and Sample

In order to accomplish the objectives, set for this exploratory investigation, two surveys were conducted in order for (i) university teachers and (ii) students share their opinions regarding how they evaluate their experiences, pitfalls and advantages of online teaching models as well as evaluation impacts during the pandemic period.

Regarding the questionnaire structure, it was organized in four different areas: (i) information about the respondent, (ii) perspectives they have about online teaching, (iii) challenges arising from online teaching and (iv) evaluation methods and implications used during the pandemic period.

Concerning teachers' universe, 188 valid responses have been considered, and thus subject to this empirical study, on a total of 188 responses received. As for that, we verified that a portion of 27.0% of respondents were not happy with the online teaching experience, which

implies that we considered a portion of 73.0% that verify the characteristics of revealing a fairly good experience with online teaching.

As for students, a total of 1.859 valid answers were obtained. We also verified a portion of 26.0% of respondents not comfortable with online teaching environment, thus it was considered a proportion of 74.0% that verify the characteristics of the issue in study. Sample size adequation was calculated as follows:

$$n = \frac{pxq}{\frac{D^2}{Z_a^2} + \frac{pxq}{N}}$$

As for teacher's universe each variable represents:

n the sample size;

Zα/2 the critical value that corresponds to the desired degree of confidence (1,96);

p the proportion of the population that verifies the characteristic under study (73.0%);

q the proportion of the population that does not verify the characteristic under study, i.e. (1-p = 27.0%); and

D the margin of error or maximum estimation error that identifies the maximum difference between the sample mean (X) and the true population mean (6,5%).

As for students's universe each variable represents:

n the sample size;

Zα/2 the critical value that corresponds to the desired degree of confidence (1,96);

p the proportion of the population that verifies the characteristic under study (74.0%);

q the proportion of the population that does not verify the characteristic under study, i.e. (1-p = 26.0%); and

D the margin of error or maximum estimation error that identifies the maximum difference between the sample mean (X) and the true population mean (2.0%).

The sample size is adequate to the teacher's universe in study (Portugal) on a 95.0% confidence level, and having in mind a total of around 38.000 active Professors with a PhD degree in this country[4]. For the data collected we calculate a minimum relevant sample of 175 answers for the teacher's universe, thus the sample size obtained is adequate and relevant for the purposes of the study carried out.

The sample size is also adequate to the student's universe in Portugal on a 95% confidence level, having in mind a total of around 412.000 active students in a college level or above[5]. We, therefore, estimate a minimum relevant sample of 1.760 answers for student's universe, thus the sample size is also sufficient and relevant for the purposes of this study-

The questionnaire issued approached the answering teachers and students about their level of agreement and opinion based on a 5 level Likert Scale. We find this methodology is adequate for the article purposes as it is often used to measure respondents' attitudes by asking the extent to which respondents agree or disagree with a particular question or statement. According to Reis *et al.* (2019), the instrument used is adequate to evaluate the opinion or acceptance degree of a certain issue under evaluation. SPSS statistical software was used for data analysis.

4. Data analysis

4.1 Sample Description

The sample consists of two groups which we describe below:

4.1.1 Teachers

The sample obtained of 188 respondents, may be classified as follows, in terms of (a) gender, (b) age, (c) professional category and (d) teaching experience. The collected sample is described in Table 1.

[4] Source/Entidades: DGEEC/ME-MCTES, PORDATA. Last update: 2022-09-22

[5] Source/Entidades: DGEEC/ME-MCTES, PORDATA. Last update: Censos21

As shown, the sample is composed mainly by men (70,2%), being the female proportion of 29,8%. Taking into consideration the age of the respondents, we can conclude that the sample is mainly composed by teachers with 32-62 years old.

Regarding the professional category is important to understand the regular composition of the professors at the university system concerning the professional level. We can state that graduate professors amount 23,4% of the total respondents.

In terms of teaching experience measured in years, the large majority of respondents have a significant teaching experience since it is more than 14 years (61,7%). This is important, since it allows a more robust and experienced scenario about the applied questionnaire.

Table 1

Teachers sociodemographic characteristics

	N	**%**
Sex		
Male	56	29,8
Female	132	70,2
Age (M = ; SD =)		
32 - 42	48	25,5
42 - 52	68	36,2
52 - 62	60	31,9
> 62	12	6,4
Professional category		
Assistant Professor	144	76,6
Associate Professor	32	17,0
Full Professor	12	6,4
Teaching experience		
< 2	8	4,3

2 - 5	16	8,5
5 - 8	28	14,9
8 - 11	4	2,1
11 - 14	16	8,5
> 14	116	61,7

4.1.2 Students

The sample obtained of 1.859 respondents, may be classified as follows, in terms of (i) gender, (ii) age, and (iii) level of studies (table 4).

Table 4 – Student's gender and age

Gender	**Frequency**	**Percentage**
Female	1087	58,5
Male	772	41,5
Total	1859	100,0
Years	**Number**	**Percentage**
18 - 24	1506	81,0
25 - 34	203	10,9
35 - 44	95	5,1
45 - 54	55	3,0
Total	1859	100,0

The obtained sample is more or less balanced in terms of gender. Regarding student´s age, as expected, the youngest group (18-24 years old) composes the majority of students (81%).
Finally, regarding the cycle of studies (table 5) we find that the majority of the respondents are composed by students who attend the 1st cycle of university studies (80%).

Table 5 – University cicle

		Frequency	Percentage
	College Degree	1487	80,0
	Post-Graduation	9	0,5
	Masters Degree	298	16,0
	Ph.D	65	3,5
	Total	1859	100,0

4.2. Perspectives about online classes

In order to analyse the major perspectives about online classes, we will present a descriptive and in the following aspects regarding each of the variables studied in this article.

4.2.1 Perspectives about online teaching

On a first instance respondents were asked to share their experience regarding online teaching during the pandemic period. Answers are presented in table 8.

Table 6 - Experience about online teaching – teachers and students

		Teachers		Students	
		Frequency	Percentage	Frequency	Percentage
	Insuficcient	8	4,3	295	15,9
	Reasonable	44	23,4	188	10,1
	Good	80	42,6	433	23,3
	Very good	40	21,3	576	31,0
	Excellent	16	8,5	367	19,7
	Total	188	100,0	1859	100,0

These results show a clear tendency to a fairly good experience regarding online teaching experience. This shows that extremely bad or excellent levels of experience are residual within the respondents (central answer tendency).

When we compare these conclusions regarding teachers with the results obtained for students, we conclude that more than 74% of respondents stated that they had a good, very good or excellent experience with online classes. Only 26% of students reveal a bad or very bad experience of online classes.

These results show that both students and teachers have coincident opinions regarding what they experienced with online environment, being mainly, good, very good or excellent experiences.

4.2.2 Challenges arising from online teaching

A second vector that it is intended to study within online teaching during the pandemic is how professors and students evaluate the strong and weak points of such learning method, as the main challenges that also arise from online teaching.

In order to approach this issue, it was questioned to respondents what would be the weaknesses and strengths of online teaching (table 7).

Table 7 - Weak points of online teaching - teachers

		Frequency	Percentage
	No integration and socialization with students and teachers	104	55,3
	Online evaluation	44	23,4
	Time spent with PC	32	17,0
	Manage timings	4	2,1
	Other	4	2,1
	Total	188	100,0

It is very clear that socialization and integration amongst teachers and students is undoubtedly the major problem identified by professors (55,3% of answers) and also, it is very clear that the evaluation process may arise as a problem for a significant part of teachers (23,4%).

Table 8 - Weak aspects of online teaching - students

		Frequency	Percentage
	Connection Problems	150	8,1
	Diifculties with PC's Tablets…	25	1,3
	Manage timings	339	18,2
	No integration and socialization with students and teachers	681	36,6
	Time spent with PC	495	26,6
	Online evaluation	169	9,1
	Total	1859	100,0

Although with a slightly lower concentration, the lack of socialization between students and teachers is shown as being the weakest point of online classes. Online evaluation does not appear to have the same importance to students than to teachers (9,1% against 23,4%).
Regarding the positive aspects of online teaching, the answers were as follows:

Table 9 – Positive aspects of online teaching - teachers

		Frequency	Percentage
	No travelling time wasted	88	46,8
	Strong engagement of teachers and students	32	17,0

	Easy to Schedule lessons and presentations	28	14,9
	Quick adpat from students	28	14,9
	Other	12	6,4
	Total	188	100,0

A very significant concentration on the fact that online teaching saves time on travelling is clearly observed. Also relevant is the strong engagement shown by professors and students due to the pandemic issue.

As for students, the strong points of online teaching are listed in table 10.

Table 10 – Positive aspects of online teaching - students

		Frequency	**Percentage**
	No travelling time wasted	1025	55,1
	Easy to Schedule lessons and presentations	558	30,0
	Help improve IT knowledge	263	14,1
	Availability of teachers to help students	13	0,8
	Total	1859	100,0

Once again, results are consistent between teachers and students as no travelling appears to be the main strength of online teaching.

The most important challenges that resulted from online teaching are listed in the following table.

Table 11 – Online teaching challenges

	Teachers		Students	
	Frequency	**Percentage**	**Frequency**	**Percentage**
Manage all interactions between teachers and students	112	59,6	824	44,3
Info circulation	36	19,2	515	27,7
Platforms capacity	24	12,8	250	13,4
Online comunity creation	4	2,1	200	10,8
Other	12	6,3	70	3,8
Total	188	100,0	1859	100,0

Concerning the challenges, there is a clear concentration on the management of all interactions that happen during and after classes, that is, is difficult to teachers to manage all the activities that happen alongside the teaching process (59,6%).

Results show a strong consistency amongst teachers and students, being clear that the management of all interactions and the control information circulates the two main challenges that arises to online environments (these two challenges show a cumulative percentage of above 70% in both samples).

4.2.3 Evaluation methods used and implications

On a first moment, we investigated the teacher´s preferences regarding the evaluation process, in order to understand the level of acceptance on online evaluation (table 12).

Table 12 – Evaluation method preference

	Teachers		Students	
	Frequency	**Percentage**	**Frequency**	**Percentage**
Presential	152	80,9	1313	70,6
Online	24	12,8	546	29,4
Other	12	6,4	…	…
Total	188	100,0	1859	100,0

Once again. a consistency between teachers and students is observed since there is a clear preference for presential methods (80,9% for teachers and 70,6% for students).

Finally, in order to assess whether online evaluation had an impact on the final results, 34% of the teachers seem to disagree or simply don´t have an opinion (49%) about such fact, as follows (table 13).

Table 13 - Did final results improve - teachers

	Frequency	**Percentage**
Tottaly agree	4	2,1
Agree	28	14,9
No opinion	92	48,9
Desagree	48	25,5
Totally desagree	16	8,5
Total	188	100,0

As for students, although the question was about increase or decrease on results, the outputs show once again that there is no statistical influence between online versus presential evaluation methods and results obtained.

Table 14 - Did final results improve - students

	Frequency	**Percentage**

	Increased	471	25,3
	Maintained	703	37,8
	Decreased	386	20,8
	Not Applicable	299	16,1
	Total	1859	100,0

5. Conclusion, Recommendations and Managerial implications

The COVID-19 pandemic had no national borders and it strongly affected education systems all over the world, exposing them to many inadequacies and inequities.

The current research focused on Portugal's universities and how they have adapted to the COVID-19 pandemic. The findings of this study suggest that COVID-19 evaluation and teaching methods in higher education must be carefully reflected.

The lockdowns due to COVID-19 interrupted conventional schooling with a severe impact on higher education. Due to this situation, the whole educational community as well as Portuguese universities had to made concerted efforts to keep classes during this period as well as quickly transition from presential to online classes. This situation inevitably created a huge pression on the learning and examination system because teachers, students and institutions had no time to adapt to new pedagogical concepts and modes of delivery of teaching, for which they may not have been trained.

This pandemic exposed universities to several potential disruptions and vulnerabilities. From the questionnaire, we can stress that the main problem faced by the two groups concerned the absence of integration and socialization (37% students and 55,3% teachers). The second issue was the online evaluation (23% teachers) and time spent in front of computer (27% of the students).

But students were also affected by several other issues. In particular, learners in the most marginalized groups, who didn't have access to digital learning resources or lack the resilience and engagement to learn on their own, were at risk of falling behind.

The decline in international student mobility has also reduced the available funds in countries and raised inequality among students.

Students and teachers also had to rely more on their own resources to continue learning remotely through the Internet, television or radio. Regardless these issues, both teachers (30%) as students (50%) agreed that they had a very good or excellent online experience. Anyway, even though they have managed to improve skills in today's students, only in the long-term period one will know if this situation has been fully achieved.

However, there were positive aspects like the saved time in travelling (47% teachers and 55% students) followed by the easy engagement (teachers – 17% and students – 30%) to this system. The different evaluation models were also emphasized by both groups as a good experience.

Although Portugal successfully implemented this online teaching, the majority of the sample (64%) believes that this situation will be reverted after the pandemic eradication while 28% had no opinion about this.

From the questionnaires, we also understood that curricula quality were successfully maintained at all levels of university degrees. The obtained results also give important clues about the main materials that should be used to capture student's attention (power points, games). The flexibility of this system aroused as an important characteristic to keep some online classes as a complement to presential classes (Kim & Jeong, 2018)

Therefore, after this experience, we can conclude that the capacity to react effectively and efficiently in the future must take into consideration the learning capacity from this situation.

It is also important to rethink how universities should be prepared to face adversity, guarantee skills, training and how to achieve this which underlines the importance of universities to work in close collaboration with government sectors regardless of being in the private or public sector.

Thus, both managers and governments must understand and implement adequate policies based on the value offered by the university education. Universities must keep reinventing their learning environments and complement their important student-teacher relationship.

The reopening of schools and universities must balance the unquestionable reflection on the new proposed educational benefits to students and enable to enhance the benefits against the risks of this situation to secure a more resilient society. The need for such trade-offs calls for tailored responses to the university context.

Several steps can be implemented to manage the risks and trade-offs, including accessing to internet platforms, implementing new classes standards, motivating the physical distancing measures, revising evaluation systems, and investing in staff training on appropriate measures to cope with online classes.

Universities and governments must be aware that spending on education is vital for society's future wellbeing. However, this situation may be compromised since public funds may be diverted to other areas such as health and social welfare and private funds may will also become scarce as the economy weakens and faces several problems (unemployment, inflation, instability, etc.).

6. Future investigation paths

This is a focused research on universities in Portugal. In future investigations, it would be very interesting to compare this country with other countries and understand the main challenges and opportunities aroused from this pandemic situation in each one and the (in)success of the implemented measures.

Another aspect to take into consideration is to understand if there are teaching methodological differences among various curricula and various teaching levels (bachelor, master and PhD). It would be also interesting to have a gender analysis to observe how each group adapted and led with this teaching transition.

Another important research should focus on broaden this process to all education levels and understand if there were main differences among the various groups and how this situation was held in each case.

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