Exploring the Icarus Paradox in the Specialist Doctor Education System in Indonesia: Public Perspective from Online Media

Faisal Binsar, Mohammad Hamsal

Submitted to: JMIR Medical Education
on: May 11, 2024

Table of Contents

Exploring the Icarus Paradox in the Specialist Doctor Education System in Indonesia: Public Perspective from Online Media

Faisal Binsar[1] DR (AM); Mohammad Hamsal[1] Prof Dr

[1]Binus University BINUS Business School Doctor of Research in Management Bina Nusantara University, Jakarta, Indonesia 11480 Jakarta ID

Corresponding Author:
Faisal Binsar DR (AM)
Binus University
BINUS Business School Doctor of Research in Management
Bina Nusantara University, Jakarta, Indonesia 11480
Jl. Kebon Jeruk Raya No. 27
Kebon Jeruk
Jakarta
ID

Abstract

Background: Paradox refers to the tension between the ambition to succeed as a medical specialist and the limitations of the medical education system. Indonesia has big ambitions to produce quality doctors, but there are limited infrastructure and resources that limit the educational journey of prospective specialist doctors.

Objective: This research aims to determine the Icarus paradox in the medical education system, which describes prospective specialist medical students, and the quality of health services in Indonesia. Understand how the Icarus paradox is reflected in society's perspective on medical education by paying attention to the quality of services provided.

Methods: Using a mixed methods approach, integrating quantitative and qualitative analysis.

Results: This results in three cognitive perspectives that show the existence of the Icarus paradox in the Indonesian medical education system, namely the education system perspective, society's view of students, and the health service perspective. Although there are aspirations to improve the quality of health services and medical education, there are also structural challenges that hinder the journey of the medical profession. Students who are prospective specialist doctors face various problems, the quality of health services in Indonesia is influenced by limited resources and accessibility. This perspective was developed into a conceptual model.

Conclusions: This study provides valuable insight into the Icarus paradox in the context of the medical education system in Indonesia, highlighting its complexity and emphasizing the importance of reform in medical education. This research has limitations, primarily relying on online reviews that may not be representative of the entire population, and primarily focusing on the views of the public and students, thus potentially introducing subjective bias. Therefore, these findings emphasize the importance of improving medical education and health services to effectively address the challenges faced by medical professionals. Clinical Trial: -

(JMIR Preprints 11/05/2024:60452)
DOI: https://doi.org/10.2196/preprints.60452

Preprint Settings

1) Would you like to publish your submitted manuscript as preprint?

✓ **Please make my preprint PDF available to anyone at any time (recommended).**
Please make my preprint PDF available only to logged-in users; I understand that my title and abstract will remain visible to all users.
Only make the preprint title and abstract visible.
No, I do not wish to publish my submitted manuscript as a preprint.

2) If accepted for publication in a JMIR journal, would you like the PDF to be visible to the public?

✓ **Yes, please make my accepted manuscript PDF available to anyone at any time (Recommended).**

Yes, but please make my accepted manuscript PDF available only to logged-in users; I understand that the title and abstract will remain v
Yes, but only make the title and abstract visible (see Important note, above). I understand that if I later pay to participate in <a href="http

Original Manuscript

Original Paper

Faisal Binsar
BINUS Business School Doctor of Research in Management,
Bina Nusantara University, Jakarta, Indonesia 11480, faisal.binsar@binus.ac.id
https://orcid.org/0000-0003-1173-5603

Mohammad Hamsal
Management Department, BINUS Business School Doctor of Research in Management,
Bina Nusantara University, Jakarta, Indonesia 11480, mhamsal@binus.edu
https://orcid.org/0000-0003-4472-2964

Exploring the Icarus Paradox in the Specialist Doctor Education System in Indonesia: Public Perspective from Online Media

Abstract

Background: Paradox refers to the tension between the ambition to succeed as a medical specialist and the limitations of the medical education system. Indonesia has big ambitions to produce quality doctors, but there are limited infrastructure and resources that limit the educational journey of prospective specialist doctors.
Objective: This research aims to determine the Icarus paradox in the medical education system, which describes prospective specialist medical students, and the quality of health services in Indonesia. Understand how the Icarus paradox is reflected in society's perspective on medical education by paying attention to the quality of services provided.
Methods: Using a mixed methods approach, integrating quantitative and qualitative analysis.
Results: This results in three cognitive perspectives that show the existence of the Icarus paradox in the Indonesian medical education system, namely the education system perspective, society's view of students, and the health service perspective. Although there are aspirations to improve the quality of health services and medical education, there are also structural challenges that hinder the journey of the medical profession. Students who are prospective specialist doctors face various problems, the quality of health services in Indonesia is influenced by limited resources and accessibility. This perspective was developed into a conceptual model.
Conclusions: This study provides valuable insight into the Icarus paradox in the context of the medical education system in Indonesia, highlighting its complexity and emphasizing the importance of reform in medical education. This research has limitations, primarily relying on online reviews that may not be representative of the entire population, and primarily focusing on the views of the public and students, thus potentially introducing subjective bias. Therefore, these findings emphasize the importance of improving medical education and health services to effectively address the challenges faced by medical professionals.
Trial Registration: In accordance with ICMJE recommendations, **RCTs must have been registered in a WHO accredited trial registry**. Please mention the ClinicalTrials.gov registration identifier, the International Standard Randomized Controlled Trial Number (ISRCTN), or a comparable trial identifier at the end of the abstract ("Trial Registration: ClinicalTrials.gov NCT123456"), as well as when you first mention the trial in the manuscript. When mentioning related trials (e.g. in the Introduction or Methods section) the trial registration number should also be added in brackets. **ICMJE member journals require, as a condition of consideration for publication, registration in a public trials registry at or before the onset of patient enrollment. This policy applies to any**

trial which started enrollment after July 1, 2005. JMIR authors must add an explanation to the methods section of their manuscript if a RCT meeting these criteria has not been registered. The JMIR editor reserves the right to reject any paper without trial registration without any further consideration or peer-review.

Keywords: Icarus paradox; Aspirations and realities; Medical Education; Student well-being; Community perspective; Online reviews.

Introduction

Background

The concept of the Icarus Paradox has been adopted into management literature to demonstrate paradoxical decisions in business [1]. Paradoxes in specialist doctor education systems have attracted significant attention both academically and practically. Although designed to produce high-quality specialist doctors, major challenges arise in maintaining service standards that meet expectations. On the one hand, this system is very exclusive, with a strict selection process and an adequate curriculum to ensure the quality of graduates. However, on the other hand, the quality of service to patients often does not meet the expected standards [2], causing many patients to choose to seek treatment abroad [3], [4]. Typically, institutions of higher education are considered sacred places, protected environments where students explore big ideas in a collegial atmosphere and forge friendships. However, as incidents of violence on campus come as such a shock to the broader campus community [5], academics pay relatively little attention to bullying at their institutions [6]. Lack of state and institutional control causes students to become silent about harassment [7], [8]and ultimately encourages perpetrators to continue engaging in degrading behavior [9], [10].

In recent years, specialist doctor education in Indonesia has become a major highlight. Medical students face high academic pressure, which can result in mental health disorders, burnout, and even mental illness [11]. Resident Doctors are at high risk of experiencing stress and depression, which significantly affects the quality of medical services they provide to patients [12]. Various mass media often report emergency conditions in specialist medical education, which highlights the major challenges faced by this system [13]–[15]. Health experts and policymakers are increasingly concerned about the low quality of service to patients [16], which is one of the main impacts of this paradox in the education system. News about the high level of depression among prospective specialist doctors is also a serious concern. A survey conducted by the Ministry of Health of the Republic of Indonesia in March 2024 [17]of 12,121 Specialist Doctor Education Program (PPDS) participants from 28 Vertical Hospitals (RSV) for Education showed that 2,716 (22.4%) PPDS experienced symptoms of depression, 51% of PPDS felt tired/lack of energy, 38% experienced sleep disturbances, 35% were less interested in doing anything, and 3.3% of PPDS felt they would be better off dead or wanted to hurt themselves in any way (Figure 1), illustrates how severe mental welfare problems they face.

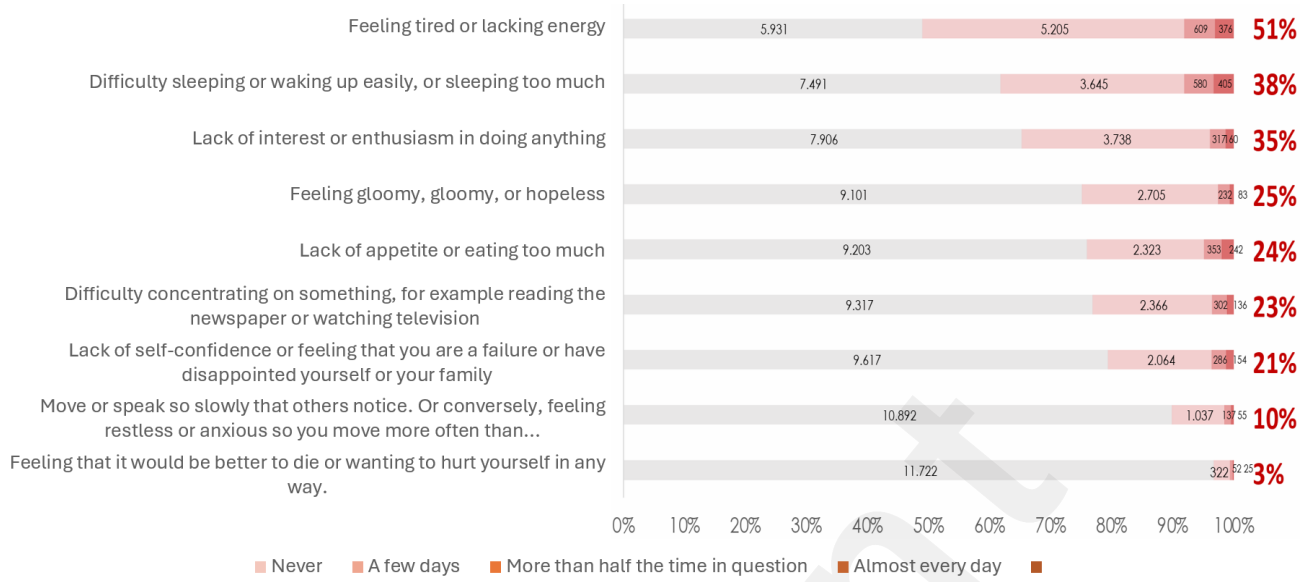


Figure 1: PPDS Mental Health Screening at Vertical Education Hospital [17]

According to the survey results, it is also known that the Top 3 Specialist Study Programs with the highest percentage of PPDS with depressive symptoms as shown in Figure 2 are Pediatrics (13.8%), Orthopedics and Traumatology (12.3%), and Internal Medicine (9.0%) [17]. This condition has a broad impact not only on individuals involved in the specialist medical education system but also on the overall quality of health services in Indonesia. Apart from that, news about prospective specialist doctors who are on the brink of depression is increasingly in the public spotlight. Many question the effectiveness of the specialist medical education system in providing adequate support and guidance for aspiring doctors. With high academic pressure and a lack of social support, many aspiring specialist doctors feel trapped in a vicious cycle of anxiety and depression.

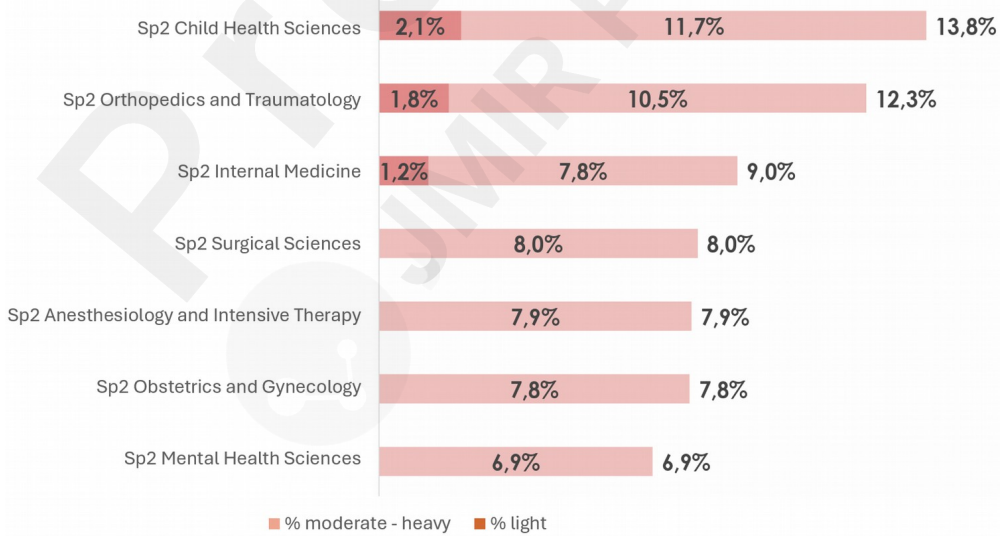


Figure 2: PPDS with the most depressive symptoms per Specialist Study Program [17]

It is important to understand how the current medical education system operates and its impact on patient care [18]. The emphasis on academic excellence in the educational process often obscures the practical and ethical aspects of medical practice. Therefore, there is an urgent need to review the approaches used in specialist medical education [19], for example by paying attention to the role of

the public in providing useful feedback [20]. The public, including students, parents, health professionals, and policymakers, plays an integral role in shaping and evaluating medical education systems [21]. Social media plays an important role as a dynamic tool in accelerating development through encouraging collaboration and exchange of ideas [22]to improve medical students' learning behavior and performance [23].

In today's digital era, online media platforms serve as centers for public discussion, where individuals share opinions, experiences, and concerns regarding various issues, including education. The public, or internet users who are active in providing reviews and feedback about health services, can be a valuable source of information [24]in evaluating the quality of specialist medical education and patient care. By utilizing appropriate technology and data analysis methods, it is possible to identify common patterns in netizen feedback and use this information to make necessary improvements in the specialist medical education system [25].

Aims of the Study

This research aims to explore the Icarus Paradox's role in describing the challenges faced by the specialist doctor education system in Indonesia from a societal perspective through online media analysis, and how this paradigm can help in designing strategies that are more adaptive and responsive to change. Understand how reputable medical educational institutions may be less responsive to changes in market demands [26], developments in medical technology [27], or regulations relating to medical practice. By examining opinions, comments, and articles related to this topic on online media platforms, this study aims to provide a comprehensive understanding of how the public perceives and evaluates the state of medical education in Indonesia. By understanding and effectively utilizing community feedback, governments, and specialist medical education providers can formulate concrete steps to overcome paradoxes and achieve higher goals in the field of medicine [19].

Theoretical Background

Paradoxical dynamics are increasingly important in contemporary organizations, and scholars are increasingly exploring their nature, approaches, and impacts. Various paradoxes arise due to different institutional logics or multiple organizational identities. Senior leaders experience a persistent tug-of-war of the strategic paradox, while mid-level managers and employees perceive this complexity in their daily work practices, socio-emotional relationships, and individual identities [28]. Paradoxes, which are contradictory but interrelated phenomena, have been the focus of successful studies [29]–[31]. However, this success may come with certain consequences, such as too rapid adoption of theoretical concepts, excess confidence in mainstream explanations, and the use of labels that maintain dominant views [32]. The Icarus Paradox is told in ancient Greek mythology, where Icarus, who was given wings to fly by his father Daedalus, was too brave and flew too close to the sun until his wings melted and caused him to fall [33]–[35].

The Icarus Paradox concept in strategic management highlights the challenges faced by organizations that have achieved a certain level of success. This paradox illustrates how past success can be a curse because it triggers risky or imprudent behavior in the future [33], [36]. The concept of the Icarus Paradox has been applied in the context of management and organizations [26]. This paradox illustrates how past success and increased self-confidence can lead to future failure. More specifically, when an organization reaches a certain level of success, this can sometimes trigger risky or careless behavior, because the organization is too confident in its capabilities and too slow to respond to environmental changes [37].

In the business world, this condition is known as active inertia, which is the inability of successful companies to adapt to changes in the business environment. This phenomenon arises when

previously successful companies fail to respond effectively to major changes in their environment, such as the emergence of new products, new technologies, or new strategies from competitors [26]. The tendency of organizations to continue to follow established patterns of behavior even in the face of dramatic environmental changes is the main cause of such failures.

In the educational context, many gaps need to be addressed, such as gaps in efforts to encourage environmental sustainability, infrastructure development efforts to expand the reach of education, educator training to improve the quality of teaching, and curricular changes to include environmental issues [38]. Furthermore, in the context of medical education, mental health is becoming an increasingly important issue because academic pressure and high professional demands can hurt the psychological well-being of medical students [39]. Many medical students experience stress, burnout, and even depression during their studies [40]. This is exacerbated by dense curricula, high workloads, and pressure to achieve high academic standards. A study by Lili et al. [11]found that specialist doctor students in Indonesia experienced high levels of stress and depression, with negative impacts on their well-being.

The existence of mental health problems among medical students also has an impact on the quality of medical services provided to patients. Medical students who experience stress and depression tend to perform less well in clinical practice [10], as well as being prone to medical errors and a lack of empathy for patients [41]. Apart from that, the stress experienced by specialist doctor students can also lead to burnout when they become residency doctors or specialists [12].

It is important to pay attention to the mental health of medical students in medical education programs. Providing adequate support and accessibility to mental health services in academic settings can help reduce levels of stress and depression, as well as improve the psychological well-being of medical students [41]. Additionally, incorporating mental health training into medical education curricula can help students develop skills to cope with stress, build mental resilience, and recognize signs of mental health problems in themselves and their peers [40].

Paradoxes in specialist doctor education involve a mismatch between the expected standard of graduates and the quality of care that occurs. The standards set for graduates to become doctors are very high, but often the medical services provided by the majority of medical personnel do not meet these expectations. This shows that there is a gap between what is expected from graduates and the reality on the ground in terms of health services [42]. Similar challenges also occur in specialist medical education, where changes in curriculum and teaching methods are urgently needed. Even though the selection process for admission to specialty programs is very strict and the curriculum is designed to produce quality doctors, there is still a gap between expectations for the quality of specialist graduates and the reality of clinical practice [10]. Adaptations are needed in specialist medical education to ensure that graduates have skills and knowledge relevant to actual medical needs. Therefore, improvements in curricula and teaching methods are essential to overcome the gap between expectations and reality in the specialist medical education system. Medical culture and medical education may need to consider recognizing that emotional reactions are a potentially valuable and integral part of clinical practice [41].

Social media increasingly plays an important role in providing information, facilitating collaboration [22], and expanding access to educational resources [43]. Social media offers a dynamic platform for sharing knowledge, clinical experiences, and scientific discussions between medical students, doctors, and other health professionals [44]. Through social media, medical students can access a variety of learning resources, including teaching materials, learning videos, and scientific articles, that can help improve their understanding of medical and clinical concepts. Additionally, social media also allows students to engage in group discussions, exchange ideas, and clinical case studies, which can improve their analytical and problem-solving skills. This helps create a collaborative and inclusive learning environment where students can learn from each other and support their academic

growth [21]. Medical specialty students can use platforms such as Twitter, Facebook, or LinkedIn to follow prominent health-related accounts, attend online medical conferences, and join discussion groups that focus on specific topics in medicine. For example, social media accounts dedicated to mental health provide useful tips, advice, and support [45]for medical students who may be experiencing stress or depression.

Social media allows for mutually supportive online communities among medical students. Facebook groups or discussion forums on Reddit can be places where students can share experiences, ask for advice, and provide support to each other in facing mental health challenges. With this community, medical students feel more connected and supported by their peers [46], which can help reduce isolation and improve psychological well-being. By participating in online medical communities, students can connect with senior doctors, health experts, and specialists in various fields of medicine. This provides an opportunity to learn from the experiences and insights of more experienced practitioners, as well as expanding opportunities for mentorship and future career development. Social media can influence [22]Studies on the impact of social media on medical learning show that students tend to use these platforms to seek support, share learning experiences, and seek advice from fellow students and medical practitioners. This suggests that social media can be an effective tool for strengthening relationships between fellow students and medical practitioners, as well as facilitating collaborative learning [23].

However, social media also has its challenges and risks in the context of medical education. For example, unverified medical information can easily spread on social media platforms, which can lead to the spread of inaccurate or even harmful information [47]. Excessive use of social media can also disrupt the balance between academic and personal life, disrupting study focus and mental health. Therefore, medical students should use social media wisely and critically, verify information before sharing it, and limit the time spent on these platforms to maintain balance in life.

Community involvement is also important in enriching the learning experience of specialist medical students [23]. Netizens, or active internet users who provide feedback on health services and medical education, can be a valuable source of information for medical education institutions. Through social media platforms and online forums, netizens can share experiences, provide input [18], and provide different perspectives on health issues and medical education. This helps specialist medical students to understand more deeply the community's needs and expectations for health services. In addition, collaboration between medical education institutions, medical practitioners, and the community can help identify problems that exist in the specialist medical education system [21], [48].

Methods

This research uses a mixed methods approach [49], which integrates quantitative and qualitative analysis to gain a deep understanding of the Icarus paradox in the Indonesian specialist medical education system. This approach involves collecting qualitative data in the form of text reviews from online platforms, as well as using quantitative methods to analyze data such as keyword frequency or sentiment measurements.

Data Collection

Data collection for this research used Brand24 [50]–[52] as a monitoring tool that allows focused and comprehensive analysis of conversations taking place on platforms such as Twitter [53], online news, blogs, videos, discussion forums, and websites [54], [55]. The review data is focused on the Indonesian language to obtain only reviews regarding the medical education system in Indonesia. The keywords used for the search consisted of "PPDS", "resident doctor", "specialist candidate", "collegium", "medical student", and "medical education" ("PPDS", "resident doctor", "specialist candidate ", "collegium", "medical student", and "medical education"). Data is stored in Microsoft

Excel format by storing information in the form of posting time, ID or user name, source, review content, sentiment category, number of replies, number of likes, number of reposts, number of followers, and influence score.

Data Analysis

After the data was collected, we conducted sentiment analysis to evaluate netizens' attitudes and opinions towards the specialist medical education system and health services in Indonesia. This research continues by carrying out a structured and focused content analysis, starting with the stage of cleaning the data from possible links, or other signs that may not make a significant contribution to the meaning of netizen reviews, but still maintain the substance of the review. In this process, duplicate data is also deleted. All of these stages were carried out using Python, utilizing text mining and Natural Language Processing (NLP) features [56], [57]as well as using the Natural Language Toolkit (NLTK), spaCy, Pandas, and Scikit-learn. Because the review data taken was in Indonesian, it was then translated into English. After that, the next stage involved coding each piece of data to identify key concepts or themes that consistently emerged in netizen discussions. This process is then continued with code grouping to group data that has similar content or topics, which allows the formation of more organized and meaningful themes. In carrying out these stages, the research used Nvivo 14 software as a tool that provides support for transparency and systematicity in the content analysis process [58]. This method of content analysis involves carefully reading line by line in the text, extracting important quotes, and assigning relevant codes to achieve a deep understanding of the related issues discussed by netizens. A summary of all these stages is shown in Figure 3.

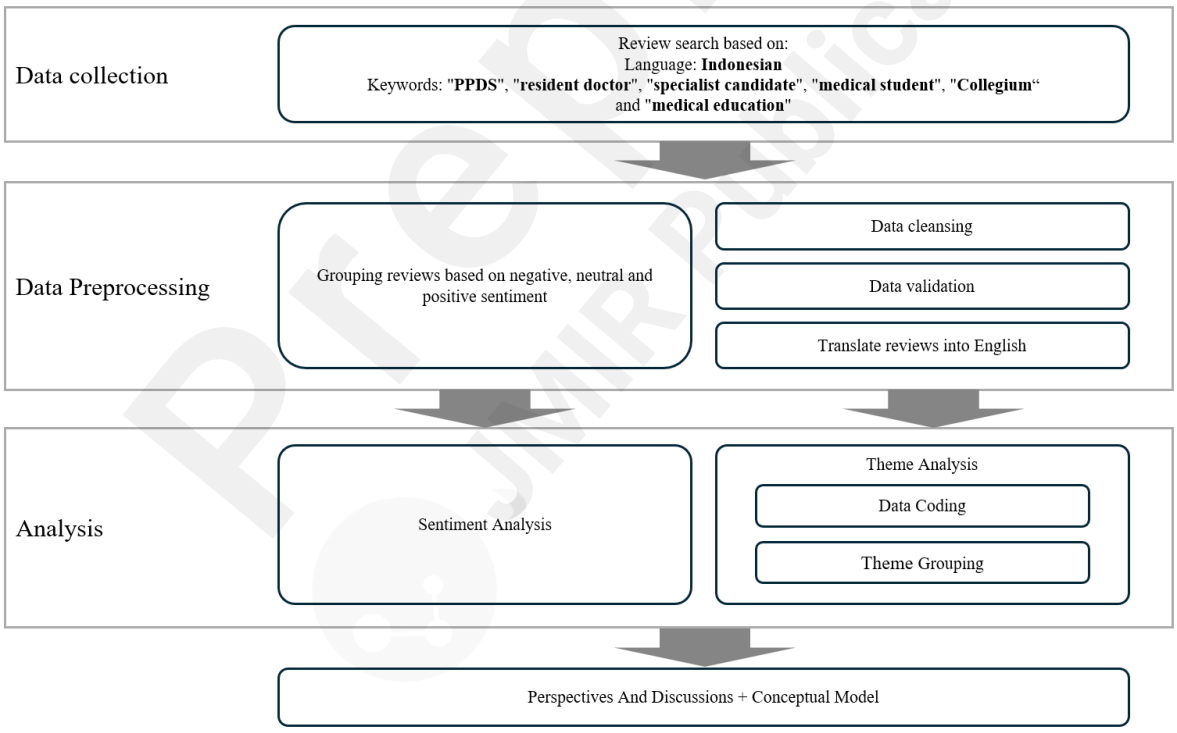


Figure 3: Stages of the research process

With the stages of the method that have been described, the meaning implied in netizen discussions regarding the Indonesian specialist doctor education system can be analyzed systematically and structured, enabling researchers to identify patterns, trends, and key issues that emerge from various online conversations. The thematic findings resulting from this research are not just a summary, they further provide an in-depth and detailed representation.

Results

Online Review Data

Data collected for 30 days (24 March 2024 – 23 April 2024), the total reviews collected through the keywords used reached 5,051 which were spread widely across various digital platforms, including X and Twitter, TikTok, video, news, Podcasts, forums, blogs, and websites (Figure 3). This digital content distribution analysis comprehensively depicts how mentions are spread across platforms and provides valuable insight into how significant a topic is based on the keywords used on each platform.

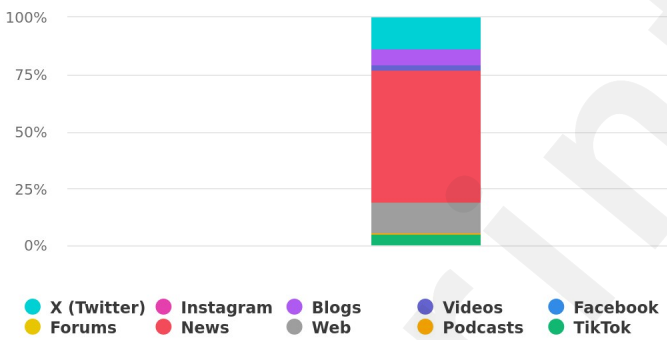


Figure 3: Reviews per Platform

The platform with the highest number of reviews is News with a total of 3043 reviews, followed by the Web platform with 692 reviews, and Twitter with 573 reviews. On the other hand, the Podcasts platform has the lowest number of reviews, namely only 6 reviews, followed by Forums with 5 reviews. The number of reviews from the TikTok and video platforms is also quite significant, with 283 and 96 reviews respectively. From the variation in the number of reviews, it can be seen that people use various online platforms to share views and opinions related to medical education in Indonesia, indicating high interest and participation in this topic in various online media.

Sentiment Analysis

The data collected also produces positive and negative sentiments regarding these topics on each platform, with details can be seen in Table 1. The online review data that has been collected shows significant variations in the number of reviews and sentiments across various platforms. From the data obtained, Twitter has a total of 573 reviews with 218 negative reviews, 251 neutral reviews, and 104 positive reviews. TikTok, despite having a lower total number of reviews, shows a similar distribution of 283 reviews, with the majority (225 reviews) in the neutral category. Video-based platforms, including YouTube, had a total of 96 reviews, with the majority in the neutral category (89 reviews). On the other hand, the news platform (News) shows a significant number of reviews with a total of 3,043 reviews, but the majority of these reviews (2,885 reviews) are in the neutral category, with 105 positive reviews and 50 negative reviews. Podcasts and online forums had a relatively low number of reviews, with a total of 6 and 5 reviews respectively. Among these platforms, reviews on blogs and websites (Web) stand out with a total of 353 and 692 reviews respectively, with the majority of reviews in the neutral category (329 reviews for blogs and 599 reviews for websites). From this data, it can be seen that the distribution of sentiment varies across platforms, with the majority of reviews tending to be neutral.

Table 1: Distribution of review data per platform

Platforms	Negative	Neutral	Positive	Total
X (Twitter)	218	251	104	573
TikTok	19	225	38	283
Videos	1	89	6	96
News	50	2,885	105	3,043
Podcasts	0	6	0	6
Forums	0	5	0	5
Blogs	11	329	13	353
Web	13	599	80	692
Total	**312**	**4,389**	**346**	**5,051**

From this data, it can be seen that the Twitter platform has the highest number of negative sentiment reviews, followed by TikTok. Meanwhile, the platform with the highest number of positive sentiment reviews is TikTok, followed by Twitter. Podcasts and forum platforms do not show any negative or positive sentiment. Meanwhile, video and web-based platforms have a low number of negative and positive sentiment reviews. Meanwhile, news platforms show a fairly low number of negative and positive sentiment reviews, with neutral sentiment dominating. Overall, the percentage of negative sentiment of around 6.18% (312 reviews) is smaller than the percentage of positive sentiment of 6.85% (346 reviews), as shown in Figure 3.

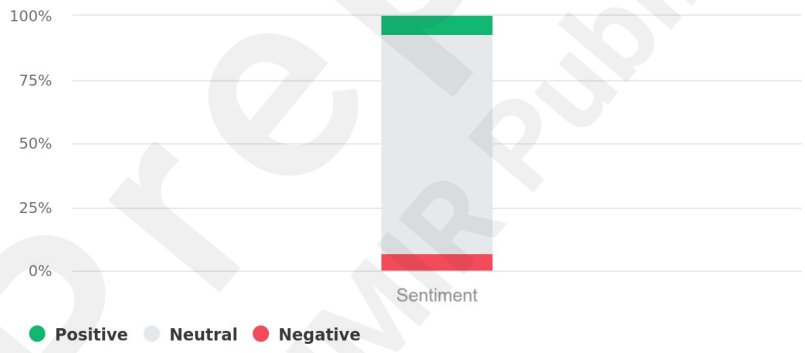


Figure 3: Sentiment breakdown

Figure 4 shows the trend of daily positive and negative reviews for one month. From the figure, it can be seen that at the beginning of the month, the number of positive and negative reviews was relatively few and stable. However, starting April 16, there was a significant increase in the number of positive and negative reviews. This is in line with reports in the mass media regarding the results of the PPDS mental health screening [17]on that date [13], which may have triggered an increase in online activity related to the topics discussed in the research.

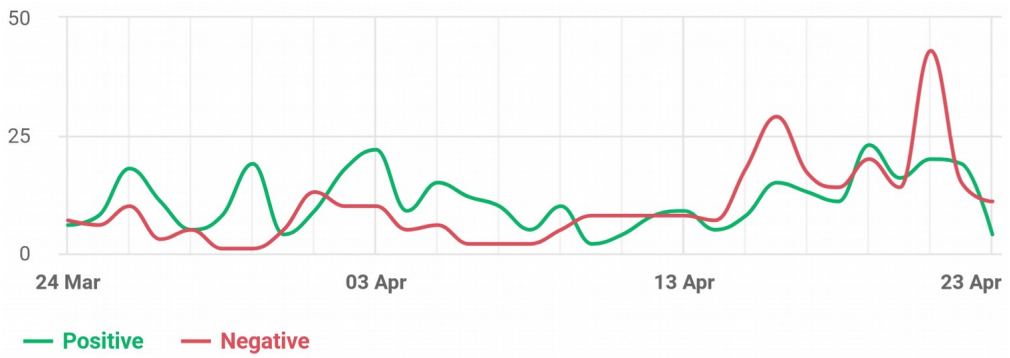


Figure 4: Sentiment-based review history for 1 month

Coding Review Topics

After carrying out the data cleaning stage, 292 reviews with negative sentiment were obtained, while 317 reviews with positive sentiment were obtained. This data was then analyzed using Nvivo 14.

Negative Review Topic Coding

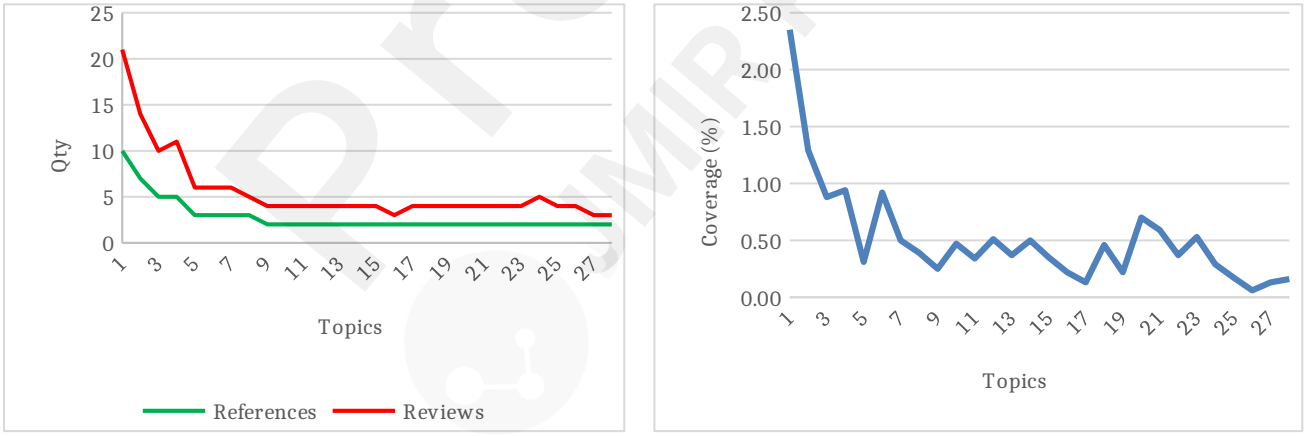
As the initial aim of this research, each sentiment in the review was coded to find review themes. We use the autocode feature provided by NVivo to automatically recognize and mark text or other qualitative data based on predetermined rules. This feature allows researchers to save time in the data analysis process, especially for large data, by automatically identifying certain patterns or categories. NVivo uses techniques such as text analysis and content analysis to identify patterns in text and tag or code data based on those patterns. Autocode can help researchers identify emerging topics in their qualitative data quickly and efficiently [59]. The negative review autocode results produced 28 topic codes, as shown in Table 3.

Table 3: Topics in Negative Reviews

Topic Number	Topics	Topic Feature Words
1	doctors	intern doctors, resident doctors, alone specialist doctors, emergency room doctors, previous doctors, procuring specialist doctors, prospective doctors, teachers specialist doctors
2	specialist	lung specialist, alone specialist doctors, dermatology specialists, otolaryngology specialists, procuring specialist doctors, teachers specialist doctors
3	students	medical student status, boarding student, dental students, nursing students
4	hospitals	vertical hospitals, hospital environment, hospital management, large hospitals
5	teaching	teaching staff, teachers specialist doctors
6	medicine	internal medicine, traditional medicine
7	program	8th pregnancy program, expert master education program, study program
8	lung	lung specialist, lung disease
9	nursing	nursing student, senior nurse
10	patients	sleep patients, trigger patients
11	sleep	patient sleep, sleeping pills
12	media	media briefings, social media
13	vertical hospitals	vertical hospitals
14	health	community health center, first-class health clinic
15	education	expert master education program, medical education providers
16	expert	expert master candidates, expert master education program

	master	
17	suitable	following suit, really suitable
18	money	received money, scientific money
19	medical student status	medical student status
20	internal doctors	internal doctors
21	results	good results, solid results
22	community	community health center, local community
23	working	work strikes, working hours
24	resident doctor	resident doctor
25	urine	urine bag, urine hunter
26	smell	formalin smell, n't smell
27	stages	stage compositor, stage rotation
28	house	boarding house, halfway house

Discussion topic data generated by NVivo 14 related to negative community reviews shows that there are a variety of topics highlighted in these reviews. Of the 28 topics identified, based on the number of references and reviews (Figure 5. a), the data shows that the topics of discussion tend to be spread out with significant variations in the number of references and reviews. Most topics have an equal number of references and reviews, with some topics such as "doctors" and "specialists" having a slight difference in the number of references and reviews. However, when looking from a coverage perspective (Figure 5. b), most topics have low scores, indicating that these topics are not widely discussed in the data. Although there are some topics with higher coverage values, such as "intern doctors" with 0.70%, most topics only have coverage values below 1%. Nevertheless, it is still important to pay attention to this topic because some topics can affect the validity and representativeness of the analysis results.



(a) (b)

Figure 5: References, Reviews (a), and Coverage (b) per Topic Negative Reviews

Based on online public reviews, various negative sentiments are emerging regarding the medical education system in Indonesia. Excerpts of the most popular reviews are presented in Table 4. One of the most popular themes is the issue of teacher qualifications, whose academic competence and experience are often questioned. A review from a Twitter user with the account @tanyarlfes questioned whether people wanted to be operated on by doctors who had questionable educational backgrounds. This review received a positive response with more than 9 thousand likes and 300 reposts. Furthermore, patient experiences have come under serious scrutiny, especially regarding

frequent examinations and lack of rest time, as conveyed by Twitter user @dokterpulmonary. His review criticizing routine check-up habits and concerns about their impact on patient's health received more than 2,500 likes and 500 reposts. Additionally, the high workload and mental stress that accompanies it are also a serious concern, as commented by TikTok user @munadamufrod, who mentioned the stress and fatigue experienced by aspiring doctors as part of the training experience. This review received a positive response with more than 900 likes and 100 reposts. Financial problems are also a frequently discussed theme, including high financial burdens and inadequate scholarships, as voiced by Twitter user @lutfithe13th. His review criticizing the size of the scholarship and the high demand for service received more than 200 likes and 70 reposts. In addition, the lack of quality health services and medical education is also a concern, as revealed in a review on medium.com which highlights the failure of a doctor to save his loved one due to limited knowledge and skills. This review, although it did not have significant likes or reposts, attracted attention because of its emotional and personal content. All of these themes show that the medical education system in Indonesia faces serious challenges in maintaining the quality of education, the welfare of students and medical professionals, and public trust in health services.

Table 4: Most popular negative reviews

Source	Reviews	Response
Source: twitter.com Followers: 359K followers Influence score: 10/10 Posted: 2024-04-09 02:21 AM	By: threadshopee @tanyarlfes Stop comparing everything. Do you want to be operated on by a doctor who doesn't have a medical education background?	Likes: 9193 Repost: 322
Source: tiktok.com Followers: 260 followers Influence score: 3/10 Posted: 2024-04-16 12:41 AM	By: munadamufrod It's scary too... #fyp #depres #calondokter #specialist doctor #tired #stress #doctor #bully #education #ppds #senior #residency #profession #beritaviraltiktok #foryou #student	Replies: 33 Likes: 971 Repost: 124
Source: twitter.com Followers: 2930 followers Influence score: 7/10 Posted: 2024-04-18 04:43 AM	By: egharap I am very embarrassed as a resident of East Java to see Mrs. Khofifah's post below. He proudly said that East Java PPDS avoided depression while showing the Ministry of Health's survey of Vertical Hospitals and there were none in East Java even though there were no RSVs in East Java.....	Reply: 18 Likes: 620 Repost: 219
Source: twitter.com Followers: 6069 followers Influence score: 7/10 Posted: 2024-04-15 10:00 PM	By: incitu The Ministry of Health is busy taking care of PPDS, even though PPDS is under the Ministry of Research, Technology and Higher Education. If vertical hospitals are considered to be the culprit, I must issue a regulation that vertical hospitals do not have PPDS. It's rich enough to be operational. People are now young consultants at vertical hospitals who are irritated by the Jasmed scheme vertical hospitals, https://twitter.com/txtdarijasputih/status/1779842934713839657	Replies: 6 Likes: 396 Repost: 133
Source: news.detik.com Visit: 23M visits Influence score: 9/10 Posted: 2024-04-23 07:27 PM	Title: Jokowi: RI's Doctor Ratio Ranks 147th in the World, We Will Pursue This South Tangerang - President Joko Widodo (Jokowi) said that Indonesia lacks specialist doctors [...] He said that big problems will be pursued our biggest problem is not enough doctors, not enough specialist doctors	
Source: tiktok.com Followers: 747 followers Influence score: 5/10 Posted: 2024-04-21 06:00 AM	By: yunitadesyw Finally, I dared to have an opinion about this, at first I was afraid it would be thought to be spreading the word, but everyone already knew, even my parents in the village because they read the newspaper and there were a lot of misunderstandings. this is from my perspective as ppds #ppdslife #resident doctor #medicine #medicalstudent #doktertiktok #ppds	Reply: 12 Likes: 441 Repost: 48
Source: national.kompas.com	Title: Tell us about your experience of visiting various regional hospitals, Jokowi: Tens of billions in equipment, but the rooms	

Visit: 23M visits Influence score: 9/10 Posted: 2024-04-23 08:59 PM	suck... Also read: Said to be no longer a PDI-P cadre, Jokowi: Yes, thank you. Not only about hospital rooms, the Head of State also touched on the lack of specialist doctors in Indonesia [...] \Indeed, our biggest problem is a lack of doctors, doctors lack of specialists	
Source: twitter.com Followers: 1200 followers Influence score: 6/10 Posted: 2024-04-03 07:56 PM	By: lutfithe13th For doctors who are PPDS with a Ministry of Health Scholarship, @KemenkesRI provides living costs of 10 million per semester, free tuition fees (if independent, 5-20 million per semester), scientific money, etc. (approximately 5 million per semester). Total 8 semesters 200 million. Required to serve up to 2n+1 in the area, threatened with a fine of 10x the cost. Jomplang. https://twitter.com/SarangBidadari/status/1775443816138277128	Reply: 13 Likes: 211 Repost: 70
Source: twitter.com Followers: 98K followers Influence score: 9/10 Posted: 2024-04-12 10:03 AM	By: BaseAnakFK Doc, maybe you can't get PPDs without the help of a penny of your parents' money? For example, you have received a scholarship but your savings are under 100 million. Doctor couple also with income of 6 million/month. Is it possible? Thinking about non-academic expenses, especially for departmental/senior needs that are replaced (cont..)	Reply: 32 Likes: 209 Repost: 18
Source: mojok.co Visits: 6.2M visits Influence score: 8/10 Posted: 2024-04-02 12:17 PM	Title: New Medical Faculties Are Being Built Everywhere, Even Though Doctors' Welfare Is Still Low and Health Facilities Are Still Badly Said Are the teaching staff really up to par? Considering the number of specialist doctors in Indonesia is limited, let alone specialist doctors who also double as lecturers. Honestly, I don't know whether the new FK is whether the teaching staff are already specialist doctors who have a lot of experience and are qualified to teach [...] Or most of the teachers are specialist doctors...	

The negative review topics discussed by the public are visualized in a Word Cloud as shown in Figure 6. The word cloud which displays the words or topics that appear most often or have the highest significance in the analysis results is displayed in a larger size (Atenstaedt, 2012). Visualization using word clouds helps in depicting the relative frequency or importance of keywords associated with each theme [51]. This provides an easy-to-understand visual representation of the main aspects of the analysis results and makes it possible to quickly identify important points that require attention [51].

Figure 6: Word cloud of negative reviews

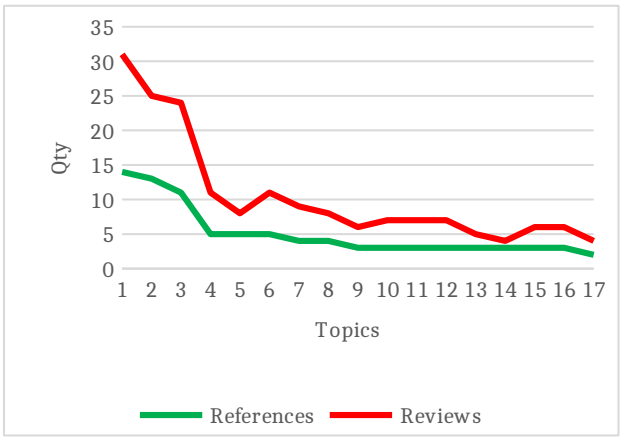
Positive Review Topic Coding

Autocoding carried out by NVivo on positive reviews produces 17 topic codes, the review topic grouping is shown in Table 5.

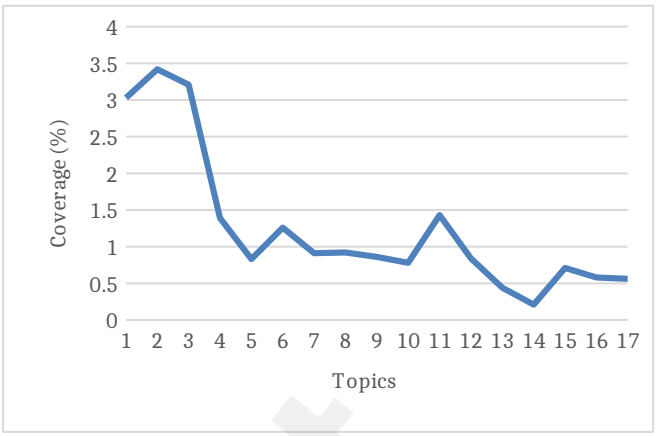
Table 5: Topics in Positive Reviews

Topic Number	Topics	Topic Feature Words
1	doctor	professional doctor candidates, resident doctors, strong doctors, aspiring doctors, eye specialist doctors, fellow doctors, general doctors, online doctor consultation applications, prospective doctors, qualified doctors, venereal specialist doctors
2	services	superior service, specialist pediatrician practice services, complex services, integrated services, medication delivery services, outpatient services, psychological consultation services, radiotherapy services, rehabilitation services, worship services today
3	students	medical students, students
4	health	various health problems, health centers, health fields, health practitioners
5	surgery	cardiac surgery, cataract surgery, general surgery, orthopedic surgery, preventive surgery
6	specialist	specialist pediatrician practice services, beauty specialist, eye specialist doctors, venereal specialist doctors
7	treatment	beauty treatment, canal treatment, treating skin, treatment techniques
8	practitioners	general practitioner, health practitioner, healthcare practitioner
9	facilities	equivalent facilities, sophisticated facilities, surgical facilities
10	consultation	direct consultation, online doctor consultation application, psychological consultation services
11	superior service	superior service
12	fields	health fields, medical fields, various fields
13	beauty	beauty specialist, beauty treatment, well-maintained beauty
14	rooms	physiotherapy rooms, reflection rooms, speech therapy rooms
15	practice	specialist pediatrician practice services, practice schedule
16	program	23 study programs, male pregnancy program, professional program
17	choices	menu choices, the right choice

Based on the number of references and reviews (Figure 7. a), the data shows significant variations in the number of references and reviews for each topic. Most topics have an equal number of references and reviews, but some have quite striking differences, such as the topics "doctor" and "services" which have a higher number of reviews than the number of references. However, from a coverage perspective (Figure 7. b), the majority of topics have quite high scores, indicating that these topics are widely discussed in the data. Topics such as "doctor" and "services" even have coverage values above 3%, indicating that they are the main focus of positive community reviews. Even though some topics have lower coverage values, the majority of them are still quite high, showing the variety of positive topics discussed in public conversations.



(a)



(b)

Figure 7: References, Reviews (a), and Coverage (b) per Topic Positive Reviews

These themes and topics are the result of an analysis of all reviews with positive sentiment. A summary of the most popular positive sentiment reviews is shown in Table 6. Reviews of positive public sentiment towards the medical education system in Indonesia via various platforms show that there are various topics. For example, in uploads on YouTube, users show their comfort in the medical education process. Likewise, on TikTok, a doctor conveys an important message to prospective doctors with the hope of enthusiasm in pursuing their dreams of becoming a doctor. On Twitter, support for aspiring doctors is palpable with enthusiasm to pursue their dreams and help many people. Similar things were also expressed on TikTok, where users encouraged aspiring doctors to continue fighting. There are also opportunities for the public to provide input, as happened on TikTok, where research on PPDS mental health opened up a positive discussion about improving the education system. All of this shows broad support from the public for prospective doctors and efforts to improve the medical education system in Indonesia.

Table 6: Most popular positive reviews

Source	Reviews	Response
Source: youtube.com Followers: 205K followers Influence score: 10/10 Posted: 2024-04-21 08:50 AM	By: Yogi Wijaya OME TV. But this prospective doctor is comfortable 😍	
Source: tiktok.com Followers: 348 followers Influence score: 4/10 Posted: 2024-04-19 11:35 PM	By: dr.anni.spb important for those who want to register for PPDS!? health #nakes #coas #coasslife #interview #intern #internship #medicine #medstudent #medical #medicals	Reply: 24 Likes: 1834 Reposted: 122
Source: twitter.com Followers: 10K followers Influence score: 8/10 Posted: 2024-04-20 02:29 PM	By: blue turn I hope everyone can succeed in becoming a doctor this year, whatever it is, you have to be enthusiastic about pursuing your dream university, prospective doctors who help many people!! ⚕	Replies: 65 Likes: 1011 Repost: 187
Source: tiktok.com Followers: 70 followers Influence score: 2/10 Posted: 2024-04-19 11:14 AM	By: ppds. come on However, at least this research opens up a new discussion about PPDS mental health ☺ What do you think needs to be improved from this research and the PPDS education system ❔ Write your opinion in the column so that our education system is better and Indonesia's health can be more advanced ☺ #ppdslife # ppdslife #specialist doctor #MentalHealth	Reply: 17 Likes: 861 Repost: 188
Source: tiktok.com Followers: 18 followers Influence score: 1/10 Posted: 2024-04-23 07:25 AM	By: saffaramadani013 spirit of future doctors 🍥 #dokterindonesia #doktermuda #gelardr #fyp #foryou #moost? #beautiful doctor #doctor #child	Replies: 1 Likes: 428 Repost: 10
Source: tiktok.com Followers: 963 followers Influence score: 5/10	By: dogi.kogi So, to be able to go back to school, I Nusantara Sehat first 2 years later received a scholarship from... [...] Good luck TS Madblood..	Replies: 8 Likes: 92 Repost: 7

Posted: 2024-04-05 02:22 AM	#doctor #dentist #dentist #ppds #ppdgs #dokterspecialis #doktergigispecialis #resident #koas #coass #fyp #fyp viral	
Source: tiktok.com Followers: 35 followers Influence score: 1/10 Posted: 2024-04-13 01:39 AM	By: fk_uii Koas is a professional program that must be undertaken by medical students to obtain a doctor's degree which is carried out in hospitals and health centers within 2 years [...] Have a good job and serve the community, prospective doctors [...] continue the exciting journey for you FK-UII professional doctor candidate, how to follow this account, like	Replies: 2 Likes: 89 Repost: 1
Source: healthynegeriku.kemkes.go.id Visit: 630K visits Influence score: 6/10 Post: 2024-04-18 01:52 AM	Title: The only Nuclear Medicine Specialist Education Center in Indonesia Therefore, since the beginning, the branding of RSHS Bandung has been nuclear medicine as well as being a superior service because this hospital is known as the only hospital in Indonesia that provides a Nuclear Medicine Specialist Doctoral Education Study Program education with the Faculty of Medicine, Padjadjaran University (Unpad).	
Source: tiktok.com Followers: 348 followers Influence score: 4/10 Posted: 2024-04-18 09:37 AM	By: dr.anni.spb Beautiful to be remembered not to be repeated 🙏 #PPDS #dokterspecialis #recidency #residentlife #tipsppds #infoppds #tesppds #istrippds #pendidikandokterspecialis #junior #bayarppds #preparationppds #medicine #ppdslife #medstudent #residen #coasslife #medicalstudent #medicaltiktok	Replies: 0 Likes: 71 Repost: 1
Source: langgam.id Visit: 613K visits Influence score: 6/10 Posted: 2024-04-20 08:12 PM	Title: Unand Hospital Determined to Become a Medical Tourism Destination in Southeast Asia [...] One of the advantages of Unand Hospital is its superior service in the field of oncology (cancer), which is supported by many specialist doctors in this field [...] \For radiotherapy (cancer radiation) services, most of the patients come from outside West Sumatra, like...	

Positive review topics discussed by the community are visualized in a Word Cloud as shown in Figure 8.

Figure 8: Word cloud of positive reviews

Cognitive Perspectives and Themes

The cognitive perspective was established to help explain how society responds to the Icarus

paradox, and how these perceptions influence their behavior regarding medical education. The cognitive perspective in the research context refers to the way individuals understand, interpret, and give meaning to information obtained from their environment. This includes how people process the information they obtain from online media, such as news articles, comments on social media, blogs, and discussion forums, as well as how their views are formed, influenced, and expressed through these platforms. [22]. The combination of all topics in positive and negative reviews is then sorted to develop appropriate themes. Each corresponding theme is then grouped into a cognitive perspective. Based on all the reviews collected in this research, we define four cognitive perspectives, namely "Education System", "Policy", "Social Views", and "Service".

Table 7: Cognitive perspectives and themes by topic of review

Cognitive Perspective	Themes	Negative	Positive
Education System	Professional Challenges	Topic 1: doctor[s] Topic 24: resident doctors Topic 25: urine	Topic 1: doctors Topic 12: fields
	Economic Challenges	Topic 18: Money	
	Workload	Topic 19: medical student status Topic 20: internal doctors	
	Medical Understanding	Topic 8: lungs	
	Teacher Qualifications	Topic 5: teaching Topic 17: suitable	
	Medical education	Topic 7: programs Topic 13: vertical hospitals Topic 15: education Topic 16: expert master	Topic 4: health Topic 16: programs
Policy	Government policy	Topic 23: working Topic 27: stages	
Social Views	About Students	Topic 3: students Topic 28: houses	Topic 3: student[s]
	Community Involvement	Topic 12: media	Topic 6: specialists
Service	Quality of Health Services	Topic 2: specialists Topic 4: hospitals Topic 6: medicine Topic 9: nursing Topic 14: health Topic 21: results Topic 26: smells	Topic 2: services Topic 5: surgery Topic 8: practitioners Topic 9: facilities Topic 11: superior service Topic 13: beauty Topic 15: practice
	Patient Experience	Topic 10: patients Topic 11: sleep Topic 22: community	Topic 7: treatment Topic 10: consultation Topic 14: rooms Topic 17: choices

The "Education System" perspective explains prospective doctors' direct experience with the medical education system and health facilities which will shape their perceptions and assessments of the quality and effectiveness of the system. The information they obtain from online media can influence how they interpret and remember their own experiences. This perspective explains several themes such as Professional Challenges, Economic Challenges, Workload, Medical Understanding, Teaching Qualifications, and Medical Education. The "Policy" perspective explains the public's response to assessing the quality of medical education and health services which is linked to the impact of government policy. Information about government policies, societal responses, and changes in the health system may influence their perceptions of the medical education system. This perspective only has the theme of Government Policy. Furthermore, the "Social Views" perspective shapes perceptions about medical education and the medical profession based on the social support they

receive from their environment. The perspectives of friends, family, and the medical community can influence how individuals understand and respond to the challenges they face in their medical education and careers. This perspective explains themes such as views for students, as well as the themes of Community Engagement and Public Health. The "Service" perspective explains public reviews regarding the experience of receiving services and the results obtained when visiting a doctor. This perspective explains themes such as the Quality of Health Services, and the Patient Experience theme. The entire cognitive perspective and its respective themes are explained further in the coding process of the negative and positive reviews below.

Based on the number of reviews on each topic, the flow and distribution between cognitive perspectives, themes, sentiments, and topics can be visualized using a Sankey diagram as shown in Figure 9. In this figure, it can be seen that 5 topics have both positive and negative sentiments, namely "program", "doctor", "student", "specialist", and "health". This means that the five topics contain contradictory paradoxical reviews. Three topics consisting of "program", "doctor", and "student" focus on reviewing positive and negative sentiments within the same theme and perspective. Meanwhile, the topics "specialist" and "health" review different themes or perspectives between positive sentiment and negative sentiment.

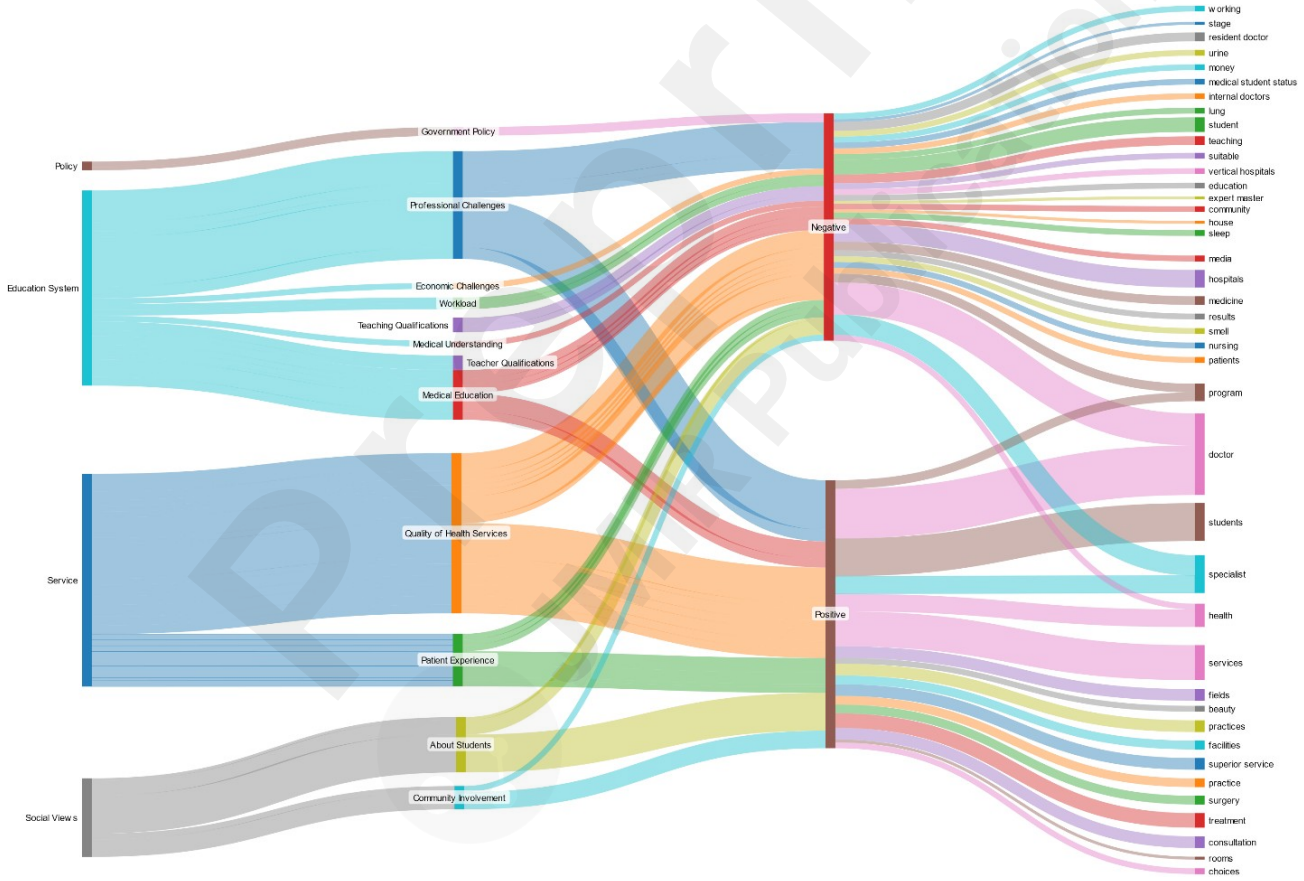


Figure 9: Sankey diagram of topic distribution for cognitive perspectives and themes

The topic "program" focuses on discussing the theme of "Medical Education" from the perspective of "Education System" in both sentiments. Public reviews regarding programs in the Indonesian medical education system show conflicting results. Positive sentiment associated with specialist doctor education programs highlights the benefits and opportunities offered to medical students. For example, the Koas (Real Work College) program is considered an opportunity for medical students to gain professional experience in hospitals and health centers. Apart from that, the various study

programs available at the Faculty of Medicine (FK), one of the state universities, show the diversity of education provided to students. This reflects the passion to broaden students' horizons and skills in the medical field. On the other hand, negative sentiment is related to issues that arise in the implementation of specialist doctor education programs. For example, cases of bullying experienced by students of the PPDS (Specialist Medical Education Program) highlight the problem of verbal or physical violence that occurs in the academic environment. The closure of certain study programs, such as PPDS radiology, also raises questions about the sustainability and quality of medical education programs. It can be observed that there is a conflict between these two sentiments, this conflicting sentiment in public reviews which do not support each other shows the existence of the Icarus paradox [33], [34]. On the one hand, there is a drive to achieve excellence in medical education by providing a wide variety of programs and opportunities for students. However, on the other hand, there is a risk that excess ambition can cause internal problems, such as cases of bullying or even a decline in the quality of academic programs. In other words, the enthusiasm for progress and development can conflict with the reality of the challenges and limitations that exist in the medical education system. A review matrix illustrating the Icarus paradox effect in the topic "program" is shown in Table 8.

Table 8: Icarus paradox matrix in reviews for the topic “program”

Cognitive Perspective: Education System	
Positive	**Negative**
• Koas is a professional program that must be undertaken by medical students to obtain a doctor's degree which is carried out in hospitals and health centers within 2 years. • Currently, FK USK has 23 study programs consisting of various levels of education. • This is a good opportunity for Indonesian omega midwives and specialist doctors to socialize with the omega male pregnancy program.	• What's worse, this bullying is experienced by expert master candidates when they are undergoing the expert master education program (PPDS) at vertical hospitals. • PPDS radiology has also been closed by the head of the study program.

The topic "doctor" focuses on discussing the theme of "Professional Challenges" from the perspective of the "Education System" in both sentiments. Positive sentiments associated with the medical profession highlight the achievements, aspirations, and hopes associated with medical education and practice. A review matrix illustrating the Icarus paradox effect in the topic "doctor" is shown in Table 9. There is an emphasis on the achievements of doctors who are considered experts in their field, as well as the success of medical students in pursuing their dreams. Apart from that, there is praise for the innovative online doctor consultation application and the hope of producing doctors who care and are useful to society. On the other hand, negative sentiments reveal the challenges and shortcomings associated with the medical profession. There is concern about the limited number of specialist doctors, especially those who also act as lecturers. In addition, there is criticism of the harsh working conditions and low wages for young doctors (internships), which can lead to problems such as work strikes. Ethical issues also arise, such as patient rights and the role of doctors in protecting those rights. This conflict reflects the dynamics between aspirations and reality in the medical profession. On the one hand, there is a passion for achieving success and positive contributions to society through medical education and practice. However, on the other hand, there are structural and ethical challenges that can hinder or even damage a doctor's professional journey. It reflects the paradox between ambition and limitation, where the drive to soar can conflict with the harsh reality of difficult conditions in the medical profession.

Table 9: Icarus paradox matrix in reviews for the topic “doctor”

Cognitive Perspective: Education System	
Positive	**Negative**
• The seminar was attended by one of the best eye specialist doctors at RSAW and the chairman of IDKI for the Banten region. • Continue the excitement of the journey of FK-UII professional doctor candidates, how to follow this account, like. • Yup, the next best online doctor consultation application is KlikDokter! • With a focus on innovative medical education and quality research, UoI Medical School attracts aspiring doctors who have the ambition to progress in the medical field. • We hope that in the future all medical students can become strong doctors who can care about society and be useful to the nation and state. • "The hope is that in the future all medical students can become strong doctors, who can see society, hopefully, they can become people who are useful to b... • Fun fact: I've fought monsters, been a legal kid, an assassin, a hero who won against 17 people, a writer, and soon will be a resident doctor. • "So it is very natural for the Unissula Medical Faculty to become a reference center for education for the best prospective doctors in Indonesia," he said. • I also want to meet the resident doctor next door and check my teeth with my handsome FRIEND.	• Considering that the number of specialist doctors in Indonesia is limited, let alone specialist doctors who also double as lecturers. • Or are most of the teachers specialist doctors? • Intern doctors, who left their workplaces on February 20 after submitting mass resignations in protest against the government's plans to increase the number of medical students, are returning to work. • This is almost the same as the case in South Korea, their internal doctors are paid low salaries but the workload is excessive, as a result, there are many work strikes, and even medical students are simultaneously not going to college as an act of protest, but it seems like voicing it here is not a solid result... • It's just a shame that it's a bull's field • Your right to use it, the previous doctor did not have the right to prohibit it either, because it is the patient's right. • With a group of resident doctors and nurses following suit.

Next, the topic "students" focuses on discussing the theme "About Students" from the perspective of "Social Views" by society on both sentiments. A review matrix illustrating the existence of the Icarus paradox in the topic "students" is shown in Table 10. Positive sentiment highlights appreciation for the efforts and achievements of medical students and health practitioners. There is an emphasis on an effective and realistic learning experience for medical students through the simulators and models provided. Apart from that, there is hope to produce doctors who are strong and care about society, as well as recognition of student achievements in various academic and non-academic activities. On the other hand, negative sentiment highlights the challenges and problems faced by medical students. There is attention to the difficulties in maintaining a balance between work and rest, as well as the ethical dilemmas faced by students when having to leave their status to pursue other vocations. Additionally, there is criticism of injustice in medical education and practice, where some students feel disadvantaged by unethical practices. This conflict reflects the tension between aspirations and reality in the medical student experience. On the one hand, there is enthusiasm and hope to become a dedicated and qualified doctor, as well as recognition of the achievements that have been achieved. However, on the other hand, there are unavoidable challenges and problems in medical education and practice, which can test students' commitment and integrity. It reflects the paradox between the ambition to succeed and the difficulties faced in achieving it.

Table 10: Icarus paradox matrix in the review for the topic “student”

Cognitive Perspective: Social Views	
Positive	**Negative**

• With complete and realistic features, this simulator helps health practitioners and medical students understand and master the treatment techniques required by various groups, including... • With realistic features, this model provides an effective learning experience for healthcare practitioners and medical students. • Come on, take a peek at "A Day in My Life" as a medical student! • We hope that in the future all medical students can become strong doctors who can care about society and be useful to the nation and state. • "The hope is that in the future all medical students can become strong doctors, who can see society, hopefully, they can become people who are useful to b... • Cakung Renewal ♡ Worship with UKI Student Brothers Thank you UKI (Indonesian Christian University) students for your worship service today 🙏♡ Medical Check Up for Tarumanegara University Medical Students ♡ Medical Check Up with Tarumanegara University Medical Student Brothers ♡ Primary School Strada • Therefore, since the beginning, the branding of RSHS Bandung has been nuclear medicine as well as being a superior service because this hospital is known as the only hospital in Indonesia that provides a Nuclear Medicine Specialist Doctoral Education Study Program education with the Faculty of Medicine, Padjadjaran University (Unpad). • This scientific meeting presented speakers from Deputy Deans 2 and 3 of the Undiksha Faculty of Medicine and class 22 medical students whose achievements were truly impressive. • Ideal for medical students who want to produce a quality thesis.	• With the nurse, with the nursing student, with the medical student, with the doctor, then when can the patient sleep and rest?" • His medical student status was abandoned and he chose to preach alone in a remote, arid, and risky area. • It wasn't just his medical student status that he left behind. • When our dental students had to study for so long, they only took a 2 day course at a hotel and then voila the next day they opened a practice by including the portfolio they got at the course which was originally stolen from the dentist.

Groups of negative and positive sentiments related to "specialists" in the Indonesian medical education system indicate different views on the role and availability of specialists in the health system. The review matrix illustrating the existence of the Icarus paradox in the topic "specialist" is shown in Table 11. The positive sentiment of the topic "specialist" mentions reviews with the theme "Community Involvement" from the perspective of "Social Views". In this case, positive sentiment highlights the important role of specialists in providing quality health services. They recognize the presence of specialists as a very important need, especially in the treatment of children or specific cases such as eye diseases. For example, one user highlighted the importance of the presence of pediatric specialists in certain areas far from major medical facilities. They also expressed confidence in the role of specialists in speeding up the patient's healing process. This sentiment highlights the positive contribution of specialists in meeting society's medical needs. In contrast, negative sentiment mentions reviews with the theme “Healthcare Quality” from a “Service” perspective. Negative sentiment expressed concern about the limited number of specialists in Indonesia, especially in the context of medical education. They highlighted the need for more specialists in the health system, especially in remote areas, as well as problems in obtaining funding and human resources to support the creation of specialists. For example, one user expressed guilt that an orphan child could not receive necessary treatment due to the absence of a lung specialist at the hospital to which they were referred. This shows the direct impact of specialist limitations on public health services.

Table 11: Icarus paradox matrix in reviews for the topic “specialist”

Cognitive Perspective: Social Views	**Cognitive Perspective: Service**
Positive	**Negative**
• The seminar was attended by one of the best eye specialist doctors at RSAW and the chairman of IDKI for the Banten region. • For the people of Singaparna and its surroundings, the presence of specialist pediatrician practice services is very necessary, considering that if you go to Lotas	• Considering that the number of specialist doctors in Indonesia is limited, let alone specialist doctors who also double as lecturers. • Or are most of the teachers specialist doctors? • "I felt guilty when an orphanage child came here for treatment because his lung disease could not be treated because there was no lung specialist so he was referred to

Tasikmalaya the distance is quite far. • The clinic is supported by specialist pediatricians so that treatment and examinations at the Kartini mother and child clinic can be carried out well until the patient recovers quickly.	Suwandi Hospital," said... • The HR sector, such as the budget for procuring specialist doctors, has never been implemented, which is a problem currently being experienced by the North Lampung district. • And, my aunt, who is a lung specialist, asked me to talk, "Nana, I think you should check for TB...

Lastly, the topic "health" discusses positive and negative sentiments from the perspective of different themes and perspectives. Negative sentiment mentions reviews with the theme "Healthcare Quality" from a "Service" perspective. The positive sentiment of the topic "health" mentions reviews with the theme "Medical Education" from the perspective of "Education Systems". A review matrix illustrating the Icarus paradox effect on the topic "health" is shown in Table 12. Positive sentiment highlights efforts and achievements in improving education and health services. They express confidence in advances in medical education, such as the Koas program which is seen as an important step toward a medical degree. In addition, there is an emphasis on innovation in medical education and research, as well as the diversity of specialist doctors in providing quality health services [60]. This shows efforts to improve the health system through increasing education and human resources in the health sector. On the other hand, negative sentiment reflects dissatisfaction with the access and quality of health services received by the community. For example, the user complained about difficulties in getting necessary care for his mother, highlighting accessibility issues and high costs in the health system. In addition, there were also expressions of skepticism about the capabilities of dentists in community health centers, reflecting doubts about the quality of medical services at the primary level.

Table 12: Icarus paradox matrix in reviews for the topic “health”

Cognitive Perspective: Education System	**Cognitive Perspective: Service**
Positive	**Negative**
• With complete and realistic features, this simulator helps health practitioners and medical students understand and master the treatment techniques required by various groups, including... • Koas is a professional program that must be undertaken by medical students to obtain a doctor's degree which is carried out in hospitals and health centers within 2 years. • These include direct consultation with a specialist or general doctor, reading articles related to various health problems from trusted sources, • With a focus on innovative medical education and quality research, UoI Medical School attracts aspiring doctors who have the ambition to progress in the medical field. • Having a variety of specialist doctors in various fields, one of the hospitals in Madiun can provide the best service for you in dealing with various health problems. • Are you interested in studying medicine and other health fields at Karolinska Institutet?	• For the past month, her mother has also been seriously ill and has been treated several times at a first-class health clinic at the level of the Community Health Center, so all costs have been focused on treating her mother. • Besides, you're strange, you still believe that even though he's a dentist at a community health center, he doesn't have the skills to install braces.

Discussion

The Icarus Paradox in this study shows the dominance of the "Education System" and "Service" perspectives, as well as the "Social View". A metaphor that describes the dilemma between ambition and reality (natural limitations) is found in community reviews. In a modern context, the Icarus Paradox reflects how humans often struggle between realizing their ambitions and realizing their

limitations [35]. For example, an individual may have great ambitions to achieve success in a career or achieve certain goals in life [36]. However, this ambition often conflicts with the fact that there are natural, social, or economic constraints that prevent the achievement of this ambition. On the other hand, the "Policy" perspective is not widely discussed by society. The discussion in this perspective is relatively free of conflict, in other words, it is only discussed in one sentiment.

The Icarus paradox in specialist doctor education programs

Medical education in Indonesia faces complex and conflicting challenges, as reflected in sentiment reviews covering both positive and negative aspects of educational programs. One of the programs in medical education is Koas (Clinical Professional Practice, or Clinical Clerkship). This program is usually undertaken after students have completed the initial years of their studies when they already have a solid foundation of knowledge in medical science. This program is considered important in preparing medical students to become qualified doctors [42]. Koas provides opportunities for students to gain extensive clinical experience in hospitals and medical centers, broadening their horizons about actual medical practices. Although often an intense and demanding period, Koas provides a solid foundation for students to enter the next stage of their education and, ultimately, become experienced medical practitioners.

The same thing also applies to prospective specialist doctors, or what is better known as PPDS (Professional Education for Specialist Doctors). This program is an advanced stage of medical education aimed at training doctors who have graduated and want to specialize in a specific field [12]. In PPDS, doctors who have graduated or have sufficient clinical experience undergo further education and clinical training under the supervision of senior specialist doctors. They deepen their knowledge and skills in a particular specialty area, such as surgery, internal medicine, radiology, or obstetrics and gynecology.

Just like Koas for medical students, PPDS provides these doctors with the opportunity to gain direct experience in clinical practice, perform more complex medical procedures, and learn from direct experience with patients [18]. This program aims to produce specialist doctors who are trained and competent in their respective fields.

Medical education requires high standards to ensure that prospective doctors have sufficient qualifications and skills to become qualified medical practitioners. However, sometimes in achieving these standards, the situation can become unhealthy and lead to intimidation or bullying experienced by prospective doctors and prospective specialist doctors in their educational programs [12]. This shows that although medical education aims to empower, there are challenges faced by students in achieving this goal. Intimidation or bullying in medical education programs can have a serious impact on student's mental and emotional well-being, as well as their ability to develop professionally. This creates a paradox where education which should provide positive support and learning becomes a source of stress and discomfort for students. In addition, the closure of certain programs by program heads, such as PPDS radiology, creates uncertainty for students and shows the lack of a stable educational structure.

Intimidation or bullying in medical education programs, both at the Koas and PPDS stages, is a problem that often occurs but is rarely discussed openly. Bullying in the context of medical education can take the form of behavior that is degrading, intimidating, or even discriminatory towards students or young doctors. This can come from fellow students, seniors, or even teaching staff. Factors such as high work pressure, intense competition, and strong hierarchies in the clinical environment can trigger bullying. Intimidation in medical education programs can hurt students' mental and emotional well-being [11]. They may feel low self-esteem, stress, or even experience mental disorders due to this treatment. Intimidation can also disrupt the teaching and learning process and reduce the quality of education students receive.

However, on the other hand, bullying can also be part of certain traditions in medical education, where some seniors believe that this method is necessary to prepare students to become strong doctors. They may see it as a way to test students' mental strength and physical endurance in facing the pressures of the real clinical world. However, it needs to be acknowledged that intimidation or bullying in medical education programs cannot be justified. Good medical education should promote an inclusive, safe, and supportive learning environment. Mentors and teachers are expected to play an important role in creating a culture that values cooperation, empathy, and mutual respect.

To address bullying in medical education programs including increasing awareness of the issue, important steps can be taken. First, a proactive approach is needed in preventing and dealing with bullying in the medical education environment [6]. This requires training for teaching staff and supervisors to ensure that an inclusive and supportive learning environment is created [61]. Preventing and addressing bullying should be a priority in every medical education program [5]. Second, reforms in the management and structure of educational programs can help ensure the availability of adequate resources and transparency in decision-making regarding program closures or curriculum changes.

In addition, it is important to continuously update curricula and learning methods [61]in medical education to ensure their relevance to the latest developments in the fields of health and education. This will ensure that graduates are prepared to face future challenges in complex medical practice. By taking these steps, it is hoped that medical education programs in Indonesia can be more effective in preparing students to become doctors with competence and integrity, as well as improving their well-being and learning experience [5]. This will help mitigate the Icarus paradox where medical education, which should be empowering [42], can become a source of difficulty and dissatisfaction for students.

The Icarus Paradox in the student context

The conflicting sentiments approach in the context of the Icarus paradox in medical education shows the complex and ambivalent journey of prospective medical specialist students. Students who are prospective specialist doctors exude enthusiasm and determination to become doctors who are dedicated, qualified, and able to make positive contributions to society [62]. This aspiration is reflected in appreciation for the achievements of doctors who are considered experts in their fields, as well as the hope that a generation of doctors will be born who care and are beneficial to society. At a more micro level, these prospective specialist medical students show pride in the achievements they have achieved in medical education, which includes success in pursuing their dreams and dedication to completing academic and non-academic tasks.

The complicated and rocky terrain faced by prospective specialist medical students reflects negative sentiments. Where the biggest challenge is maintaining their enthusiasm and motivation amidst difficult conditions in medical education and practice. Limitations in the number of specialist doctors and the presence of those who also act as lecturers create tensions in the availability of time and resources to accompany students [39]. Apart from that, they also face tough working conditions, such as high workloads and low wages for young doctors, especially during their internship period. The phenomenon of work strikes by internal doctors as a form of protest over working conditions is concrete evidence of this tension. Apart from that, ethical issues are also a concern, such as the rights of patients and the obligations of doctors in protecting those rights, which can sometimes give rise to moral dilemmas for students.

Solutions to overcome this challenge require joint efforts from various parties, including the government, medical education institutions, and health practitioners. Improving facilities and training programs, both in time management and mental health aspects, are important steps to help students manage high workloads. Psychological support and counseling can help them maintain a

balance between personal and professional life. In addition, it is also important to increase access to medical education, especially in remote areas, as well as increase the number of specialists available through specialist recruitment and placement programs in areas of need.

Furthermore, efforts need to be made to improve structures and systems in medical education and practice [61]. This includes a review of the division of duties between doctors and students, improving compensation and working conditions for young doctors, and strengthening ethical oversight in clinical practice. By creating a conducive educational and practice environment, student specialist doctors will be able to develop optimally and become doctors of quality and integrity. This will also help reduce the gap between expectations and reality which often creates paradoxes in their journey in the medical profession.

The Icarus paradox in the healthcare context

Paradoxes are an integral part of life, especially so in the context of health care [63]. In the context of health services in the medical education system, the positive and negative sentiments that emerge reflect the complex Icarus paradox in the course of the medical profession [35]. Here, there is recognition of the progress and excellence of health services provided by medical education institutions. Advanced medical simulations, for example, enable healthcare practitioners and medical students to gain a deep understanding and master the necessary treatment techniques in a safe and controlled environment before they dive into actual clinical practice. This simulation method is supported by recent research highlighting its effectiveness in improving clinical skills and medical decision-making. There has been an increase in the education and training of health workers, including doctors, nurses, and other medical personnel. This has helped increase the number and quality of health workers in Indonesia.

In addition, the Indonesian Government has made great efforts to expand the network of health facilities, especially in rural and remote areas. This includes the construction of more community health centers (Community Health Centers) and hospitals, as well as the provision of adequate health facilities and infrastructure. With the construction of more health facilities, people's access to health services has increased. This has helped reduce the access gap between urban and rural areas. This seriousness is also supported by the implementation of the National Health Insurance Program (JKN). JKN is a health insurance program that aims to provide universal health protection for the entire population of Indonesia. Through JKN, Indonesian citizens can access basic and advanced health services at affordable costs.

Not only that, health technology such as health information systems and telemedicine have begun to be implemented in several areas. This helps improve the efficiency of healthcare services and overcome accessibility challenges in remote areas. Increased cooperation between the public and private sectors has helped improve the availability and quality of health services. Many private hospitals and medical institutions play an important role in providing quality healthcare services.

Despite significant progress, there are still challenges that need to be overcome [63]. For example, there is still a gap in the quality of health services between urban and rural areas, as well as problems in the availability and distribution of health workers. Negative sentiment highlights challenges and shortcomings in health services, especially related to accessibility and quality. Several complaints regarding the cost and quality of health services at hospitals or community health centers have been highlighted [3]. In particular, the issue of accessibility remains a major challenge, especially in rural or remote areas, where health facilities are often inadequate. This creates a significant access gap in health services between urban and rural areas. Quality issues are also a concern, especially when there is an inability to provide adequate health services. Some hospitals or health centers may be ill-equipped with the human resources and facilities necessary to provide quality care. This creates a situation where patients do not receive adequate care or do not meet the expected standards [20].

Ethical issues also arise, such as compliance with medical ethical standards, especially in terms of patient rights and quality of care. Some reports indicate that sometimes patients do not receive appropriate care or that medical ethical standards are not fully followed. This conflict reflects the dynamic between aspirations for progress and the reality of often inadequate healthcare conditions.

The solution to overcome this challenge involves various parties, including medical education institutions, the government, and society [21]. Medical education institutions can play a role by improving training and education for prospective health workers, including an emphasis on practical skills relevant to society's needs. Governments must commit to improving infrastructure and resources in health facilities [48]s, as well as providing financial support to ensure equitable accessibility of health services for all. The public can also play a role by supporting government initiatives and medical education institutions, as well as raising awareness of the importance of personal health and hygiene. With strong cooperation between all relevant parties, it is hoped that the condition of health services in Indonesia will slowly improve, thereby enabling better access and higher quality services for the community. In this way, the Icarus paradox between aspirations for progress and the reality of inadequate healthcare conditions can be overcome, thereby allowing for continued development in the medical profession and healthcare as a whole.

Conceptual Model

Of the four cognitive perspectives observed in this study, namely "Education System", "Policy", "Social Views", and "Service", it seems that three of them show the Icarus paradox effect. Based on the results of this analysis, we propose a conceptual model that links these four cognitive perspectives. This model can be used as a basis for formulating holistic policies and strategies to improve medical education, public perception of the medical profession, and health services as a whole. With an integrated and holistic approach, it is hoped that the Icarus paradox identified in this study can be overcome, and the quality of the health system as a whole can be improved. The proposed conceptual model is shown in Figure 10. Perspectives with white circles have the Icarus paradox effect, while perspectives marked with gray circles do not have the Icarus paradox effect. The "Education System" perspective in this conceptual model is the main part of producing quality health services, which is largely determined by the input and role of regulations as well as social views regarding prospective doctor students.

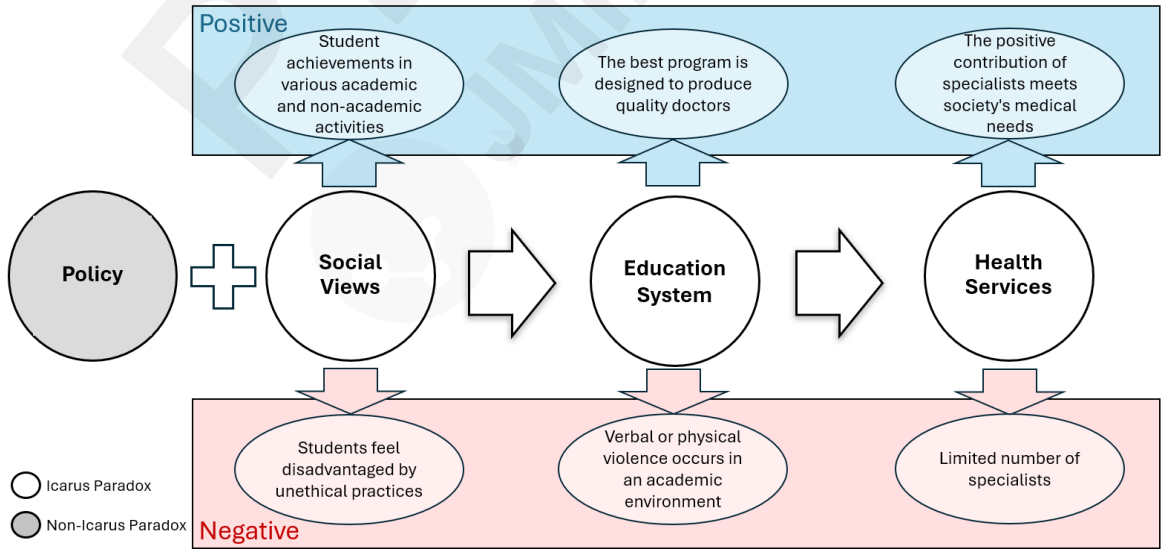


Figure 10: Conceptual Model

The "Education Systems" perspective in this conceptual model specifically highlights the challenges in medical education facing pressures to maintain high academic standards while meeting the

practical demands of the field. An indication of the existence of the Icarus paradox in the specialist doctor education system is shown by the phenomenon where the strong drive to achieve perfection in medical education conflicts with harsh reality. The education system has enthusiasm and hard work in pursuing perfection, this is supported by various programs and opportunities in medical education as well as innovative efforts in medical education and research to improve the quality and relevance of education. Although it may be done to improve the quality of specialist doctor education, reverse outcomes in the medical education system can occur due to several complex, interrelated factors. One of them is the very high pressure experienced by students in pursuing perfection. The drive to achieve high standards in medical practice, coupled with intense competition to attain certain positions or specialties, can create a highly competitive environment and high stressors among students. In addition, the dense and intensive medical education curriculum often causes excessive workloads for students. The amount of material that must be studied in a limited time, along with busy schedules and intense clinical demands, can make students feel stressed and find it difficult to maintain a balance between academic, social, and personal life.

Another aspect that can exacerbate this condition is the lack of support and resources for student welfare. Some medical education institutions may pay less attention to the mental and physical well-being of students, which leads to stress conditions that are not handled properly. A culture that supports negative behavior such as intimidation, bullying, or academic violence can also be a factor that worsens the condition. Students may feel burdened by a culture that demands perfection and find it difficult to seek help or report unethical behavior.

This situation shows the tension between the ambition to achieve perfection in medical education and the challenges and problems faced in the education system. In this view, the Icarus paradox reflects the complex dynamics between idealism and reality in the medical student experience. The Icarus paradox from this perspective is shown in Table 13.

Table 13: The Icarus paradoxes in specialist doctor education systems

Positive	Negative
• The desire to achieve excellence in medical education through various programs and opportunities for students • There are benefits and opportunities in medical education programs offered to students • The Koas (Real Work Lecture) program is an opportunity for students to gain professional experience • Innovations in medical education and research	• There are cases of bullying experienced by students of the PPDS program (Specialist Doctor Education Program) • Verbal or physical violence occurs in an academic environment • The closure of study programs such as PPDS radiology raises questions about the sustainability and quality of medical education programs

The Icarus paradox in the medical education system is the main variable in the contextual model which is very important to analyze in evaluating the effectiveness of the system in providing health services to the community. And the medical education system can become more effective in producing doctors who are ready to face real-world challenges in health care.

Meanwhile, the "Social Views" perspective, especially in the context of prospective medical students, highlights the difference between social expectations of the medical profession and the reality on the ground. Based on a summary of community reviews, data on the Icarus paradox effect was obtained from this perspective as shown in Table 14. The Icarus paradox effect in the context of medical education in Indonesia is reflected in the contrast between positive aspirations and negative realities faced by medical students. The Icarus paradox in Indonesian medical education illustrates the tension between dreams and reality, where the drive to achieve success sometimes conflicts with the structural and ethical constraints that exist in the medical profession. This can happen due to

several factors, first, the pressure from the academic and professional environment is very high. Medical students must strive to achieve high academic standards, acquire in-depth knowledge in various fields of medical science, and master complex clinical skills. This pressure can sometimes become too much, especially when they are trying to meet the expectations of lecturers, mentors, and the hospital.

Table 14: Icarus paradoxes in the medical student environment

Positive	Negative
• Outstanding students, with aspirations and hopes related to medical education and practice • Emphasis on the achievements of doctors who are considered experts in their field • The success of medical students in pursuing their dreams • Praise for the innovative online doctor consultation app • Hope to produce doctors who care and are useful to society • Student achievements in various academic and non-academic activities	• A limited number of specialist doctors, especially those who also act as lecturers • Difficulty in maintaining a balance between work and rest • Harsh working conditions and low wages for young doctors (internship) • The strike has an impact on patient rights • Some students feel disadvantaged by unethical practices

Second, there are limited resources. The lack of available specialist doctors and lecturers can make it difficult for students to receive adequate guidance and learning. This can interfere with their ability to develop the clinical skills needed to become skilled physicians in their field. Next, the third factor is financial pressure. The high cost of medical education often forces students to seek additional funding sources, such as working part-time, which can then disrupt their focus on studying. Additionally, low wages during internships, which are often required as part of the curriculum, can also cause financial stress. Fourth, there is a heavy workload and long study hours. Medical students often have to juggle busy schedules, with long hours studying in and out of class, as well as stints in hospitals or health centers. This condition can result in physical and mental fatigue, and reduce their quality of life and well-being.

As a result, medical students can be trapped in a cycle of stress, pressure, and challenges which can give rise to the Icarus paradox, where the drive to achieve success in medical education sometimes conflicts with the limitations and constraints that exist in the educational system and the medical profession.

"Social Views" in the proposed conceptual model is one of the important variables to be used as input and consideration in medical education programs, which are expected to produce quality health services.

In this proposed conceptual model, the "Policy" perspective does not directly indicate the existence of the Icarus paradox effect, but it still plays an important role. Appropriate policies can help overcome the paradoxes that arise from the other three perspectives, by providing the direction and support needed to improve the quality of medical education, change public perceptions of the medical profession, and increase access to quality health services.

Our model also proposes a "Service" perspective as the dependent variable, as well as the final output in the medical education system. The "Service" perspective results from this study as the desired final impact. This perspective in health services reveals a paradox where there is a need for high-quality health services, but there are obstacles to providing equitable access to these services. Limited resources and infrastructure sometimes make it difficult for people to get care that suits their needs, giving rise to tension between expectations of quality health services and the reality of

existing limitations. The Icarus paradox from this perspective is shown in Table 15. It is worth considering the various aspects that cause the Icarus paradox effect from this perspective.

Table 15: The Icarus paradoxes in healthcare services

Positive	Negative
• The important role of specialists in providing quality health services • Recognizing the existence of specialists is a very important need • The importance of having pediatric specialists in certain areas far from major medical facilities • Belief in the role of specialists in accelerating the patient's healing process	• A limited number of specialists in remote areas • Funding and human resource problems • Orphans cannot receive the necessary care • Difficulty in getting treatment • High accessibility and cost in the health system • Doubts about the quality of medical services at the primary level

One of the main aspects that gives rise to this paradox is the limited number and distribution of health specialists. Although health specialists are essential for providing quality care, especially in the management of complex cases, their number and distribution are often inadequate. In remote areas, for example, a shortage of specialists often means it is difficult for patients to receive appropriate and timely care, increasing the risk of complications and disability. Limited funding and human resources are also important factors in this paradox. Limited budgets and medical personnel mean that hospitals and health centers are often unable to hire or retain enough specialists. As a result, patients in remote or low-income areas often do not have access to appropriate care.

Bureaucracy and complex administration in health systems can also hinder efforts to improve the quality of services. Lengthy licensing and regulatory processes and complicated bureaucracy often slow down the formation and placement of specialists, exacerbating the imbalance between health service needs and capacity.

This condition gives rise to a paradox where aspirations to provide quality health services conflict with the limitations of the existing system [63], creating challenges that are difficult to overcome in achieving ideal health service goals. It illustrates how the drive to fly high in providing quality health services can collide with the harsh reality of difficult conditions in the health system.

Conclusion

The journey of specialist doctor education system in Indonesia still faces complex challenges, most of which are reflected in the Icarus paradox analyses, which illustrates the tension between ambition and limitations faced in the medical education system. There are high aspirations to produce qualified and skilled doctors to meet the increasingly complex health needs of society. However, on the other hand, there are limited infrastructure, resources, and education systems that still need to be improved. In this context, prospective specialist medical students become the center of attention, as agents of change in the medical education system. They are faced with high academic demands and pressure to become experts in their fields. However, they also face challenges such as limited resources, a curriculum that is sometimes less relevant, as well as tough working conditions, and mental pressure. This is what gives rise to the Icarus paradox: the passion for achieving success as a specialist doctor is at odds with the harsh reality of achieving that dream.

The quality of health services in Indonesia also reflects the Icarus paradox effect. Despite significant progress in developing health infrastructure and expanding access to services, there are still

significant disparities between health services in urban and rural areas. The health system is also faced with challenges in improving the quality of services, especially in terms of service standards and equal access for all levels of society.

To overcome this paradox, it is necessary to take bold and targeted steps [28]. Governments and health institutions need to increase investment in health infrastructure, including facilities and human resources, especially in remote areas. Improving the quality of medical education is also important, by adapting curricula to practical needs and emphasizing the development of clinical and leadership skills. In addition, it is important to strengthen the support system and mental well-being for prospective medical students, to overcome the psychological burden that often becomes an obstacle in the educational journey.

In addition, collaboration between the government, health institutions, and the community needs to be increased to achieve the common goal of improving the quality of health services [21], [48]. Expanding access and improving the quality of health services must be a top priority, ensuring that every Indonesian citizen can gain access to quality health services regardless of social or geographic background. With joint efforts and a strong commitment to overcome these challenges, it is hoped that Indonesia can move forward towards an inclusive, quality, and sustainable health system, where every individual has the opportunity to live a healthy and dignified life.

Implications

The implications of these findings are very broad, especially in the context of the medical education system, the quality of health services, and the role of student specialist doctors [21]. First, in the context of medical education, it was found that the Icarus paradox, which reflects the tension between aspirations and limitations in the medical profession, influences the experiences of medical students. This highlights the need for a revolution in medical education to face existing challenges. There need to be adjustments in the curriculum to place more emphasis on developing clinical skills [64], leadership, and communication, which are important aspects in future medical practice. The education system needs to strengthen support for students, both academically and mentally, to help them overcome the pressures and challenges that arise during their education.

Second, in terms of health service quality, these findings show that the gap between health services in urban and rural areas is still a serious problem. This indicates the need for increased investment in health infrastructure in remote areas and the provision of adequate medical personnel in these areas. In addition, improving the quality of health services must be a priority, ensuring that high standards of care and equality of access are implemented throughout the country.

Third, the role of prospective specialist doctor students in overcoming this challenge is very important. They are agents of change in the medical education system and the health system as a whole. Medical students need to be equipped with the skills necessary to address existing medical and systemic challenges and encouraged to play an active role in improving the health system. By providing them with sufficient support and resources, we can ensure that they can play an effective role in creating positive change in the health sector.

Fourth, so far, control in specialist doctor education has often been invisible or ignored but only came into the spotlight after screening by the Ministry of Health. The implication of this is the need for tighter control from both the government and universities themselves in overseeing the specialist education process.

Fifth, it can no longer rely solely on university-based education to produce specialist doctors, because this can limit the number and diversity of specialists needed in the health system. Opening up opportunities for hospital-based specialist education is an important step to increase the number of specialist doctors and ensure student welfare during the education process. This consideration is

based on the fact that the number of hospitals is generally greater than that of medical faculties at universities, thereby expanding access and increasing the distribution of specialist doctors to areas in need. This could also help reduce the educational burden typically borne by universities as well as increase the involvement of medical practitioners in specialist education. Developing hospital-based specialist education is an important step in improving and expanding the medical education system in Indonesia.

Overall, these findings indicate the need for changes in medical education and the health system in Indonesia. By recognizing the Icarus paradox that exists, it can be identified the areas where improvement is needed and take concrete steps to address those challenges. The positive areas that have been formed need to be maintained, and can even be improved. For example, hospital-based education could be expanded to increase the number of specialist doctors and support students in their educational process. Meanwhile, the identified negative areas must be reduced and solutions found. For example, governance and tighter controls are needed in specialist doctor education process, both from the government and from universities themselves, to ensure adequate quality and diversity of specialists. With a joint commitment from the government, health institutions, academics, and society, we can create a health system that is more inclusive, sustainable, and oriented towards community needs [21]. This can result in positive changes in health services and medical education, thereby having a significant impact on the welfare of society as a whole.

Limitations and further research

Although this study provides valuable insight into the Icarus paradox in the context of medical education, healthcare quality, and the role of future medical specialty students, several limitations need to be noted. First, this study primarily used data from online reviews, which may not fully reflect the experiences of the entire population. Some population groups, such as those who do not have internet access or do not use online review platforms, may not be well represented in this data. Additionally, due to the anonymous and free nature of online reviews, the quality of the information and its reliability may vary. Second, the focus of this research is primarily on the community's perspective in assessing the medical education system and health services, as well as the views of students who are prospective specialist doctors. Therefore, there is a potential for subjective bias in the data collected, especially as each individual's experiences and views may vary.

In terms of health service quality, this study did not directly measure clinical parameters or service quality indicators. The information obtained is more descriptive and qualitative. To gain a more comprehensive understanding of health service quality, further research can use more structured methods and combine quantitative data with qualitative data. Therefore, further research could overcome this limitation in several ways. First, further research could involve in-person surveys with a more diverse range of respondents, including patients [20], health practitioners, and medical students. This will enable more complete and representative data collection. Additionally, further research could use more sophisticated analytical methods, such as text analysis to identify patterns and trends in online reviews. This will allow for a deeper understanding of public perceptions of the health system and medical education.

Further research could broaden the scope of the topic to further examine interactions between factors such as healthcare accessibility, quality of medical education, and patient satisfaction, as well as longer durations of data collection (more than 30 days). Further empirical research utilizing our proposed conceptual model will be able to provide deeper and more comprehensive insight into the complex dynamics of the Indonesian health system. Thus, the results of further research will provide a more comprehensive understanding of how to improve the effectiveness of the Indonesian health system.

Acknowledgements

The authors received no financial support for the research, authorship, or publication of this manuscript.

Authors' Contributions

FB and MH drafted the review and developed the discussion. FB performs data search, collection, and synthesis. FB and MH performed the analysis, reviewed the manuscript, and studied integrity.

Conflicts of Interest

None declared.

References

1. M. M. Sulphey, “How Icarus Paradox Doomed Kingfisher Airlines,” *Vision*, vol. 24, no. 1, pp. 118–124, 2020.
2. Y. Mahendradhata *et al.*, *The Republic of Indonesia Health System Review*, vol. 7, no. 1. Asia Pacific Observatory on Health Systems and Policies, 2017.
3. H. S. Saragih and P. Jonathan, “Views of Indonesian consumer towards medical tourism experience in Malaysia,” *J. Asia Bus. Stud.*, vol. 13, no. 4, pp. 507–524, Jan. 2019.
4. G. A. Asa, N. K. Fauk, C. McLean, and P. R. Ward, “Medical tourism among Indonesians: a scoping review.,” *BMC Health Serv. Res.*, vol. 24, no. 1, p. 49, Jan. 2024.
5. L. Langford, “Preventing Violence and Promoting Safety in Higher Education Settings: Overview of a Comprehensive Approach,” pp. 1–12, 2004.
6. L. Keashly and J. H. Neuman, “Faculty Experiences with Bullying in Higher Education,” *Adm. Theory Prax.*, vol. 32, no. 1, pp. 48–70, 2010.
7. F. Bondestam and M. Lundqvist, “Sexual harassment in higher education–a systematic review,” *Eur. J. High. Educ.*, vol. 10, no. 4, pp. 397–419, 2020.
8. T. Heffernan and L. Bosetti, “Incivility: the new type of bullying in higher education,” *Cambridge J. Educ.*, vol. 51, no. 5, pp. 641–652, 2021.
9. R. Yousaf and R. Schmiede, “Harassment Act Implementation in Higher Education Institutions,” *Open J. Leadersh.*, vol. 05, no. 01, pp. 8–19, 2016.
10. S. Pisklakov, V. Tilak, A. Patel, and M. Xiong, “Bullying and Aggressive Behavior among Health Care Providers: Literature Review,” *Adv. Anthropol.*, vol. 03, no. 04, pp. 179–182, 2013.
11. R. Lili, A. Molodynski, S. M. Farrell, T. Citraningtyas, and N. A. Kloping, “Wellbeing and mental health among medical students in Indonesia: A descriptive study,” *Int. J. Soc. Psychiatry*, vol. 68, no. 6, pp. 1277–1282, Nov. 2021.
12. V. D. Perwitasari and R. Hidayat, “Depression Level Among Neurology Resident Doctors in the Faculty of Medicine , Universitas Indonesia,” *Acta Neurol. Indones.*, vol. 02, no. 01, 2024.
13. Kompas, “399 Calon Dokter Spesialis Mengaku Ingin Akhiri Hidup,” *Kompas*, 16-Apr-2024.
14. BBC News Indonesia, “Kesaksian calon dokter spesialis yang sempat berusaha bunuh diri – ‘Perundungan dijustifikasi atas nama pendidikan mental,’” *BBC News Indonesia*, 2024. [Online]. Available: https://www.bbc.com/indonesia/articles/cyj3mkp7jl0o. [Accessed: 21-Apr-2024].
15. Metro TV News, “2.716 Calon Dokter Spesialis Mengalami Gejala Depresi, 3,3% Ingin Akhiri

Hidup," *Metro TV News*, 2024. [Online]. Available: https://www.metrotvnews.com/play/b3JCr9d2-2-716-calon-dokter-spesialis-mengalami-gejala-depresi-3-3-ingin-akhiri-hidup. [Accessed: 21-Apr-2024].
16. A. W. Widayanti, J. A. Green, S. Heydon, and P. Norris, "Health-Seeking Behavior of People in Indonesia: A Narrative Review.," *J. Epidemiol. Glob. Health*, vol. 10, no. 1, pp. 6–15, Mar. 2020.
17. Ministry of Health of the Republic of Indonesia, "PPDS Mental Health Screening Results at Vertical Education Hospital," 2024.
18. F. Binsar, R. Kartono, A. Bandur, and W. Kosasih, "Digital Transformation of Information Fulfillment and Patient Engagement for Health Service Safety," *2022 4th Int. Conf. Manag. Sci. Ind. Eng.*, pp. 229–236, 2022.
19. F. C. Noya, S. E. Carr, and S. C. Thompson, "Attracting, Recruiting, and Retaining Medical Workforce: A Case Study in a Remote Province of Indonesia.," *Int. J. Environ. Res. Public Health*, vol. 20, no. 2, Jan. 2023.
20. S. Berger, A. M. Saut, and F. T. Berssaneti, "Using patient feedback to drive quality improvement in hospitals: a qualitative study.," *BMJ Open*, vol. 10, no. 10, p. e037641, Oct. 2020.
21. H. Bismantara, S. Ahern, H. J. Teede, and D. Liew, "Academic health science centre models across the developing countries and lessons for implementation in Indonesia: a scoping review," *BMJ Open*, vol. 12, no. 9, pp. 1–13, 2022.
22. A. Abid, P. Harrigan, and S. Roy, "A relationship marketing orientation in politics: Young voters' perceptions of political brands' use of social media," *J. Strateg. Mark.*, vol. 29, no. 4, pp. 359–374, 2021.
23. M. A. Ashraf *et al.*, "Social Media Improves Students' Academic Performance: Exploring the Role of Social Media Adoption in the Open Learning Environment among International Medical Students in China.," *Healthc. (Basel, Switzerland)*, vol. 9, no. 10, Sep. 2021.
24. J. M. Kim, K. K. Park, and M. M. Mariani, "Do online review readers react differently when exposed to credible versus fake online reviews?," *J. Bus. Res.*, vol. 154, p. 113377, 2023.
25. Y. Zhang, J. Q. Lian, R. De Li, and H. T. Duan, "Research on the evolution of netizens' comment focus in university online public opinion: KTF-BTM topic model with topic-temporal-focus framework," *Front. Phys.*, vol. 11, no. August, pp. 1–18, 2023.
26. D. N. Sull, "Why Good Companies Go Bad Why Good Companies Go Bad," *Harv. Bus. Rev.*, 1999.
27. N. Singh, M. Jain, M. M. Kamal, R. Bodhi, and B. Gupta, "Technological paradoxes and artificial intelligence implementation in healthcare. An application of paradox theory," *Technol. Forecast. Soc. Change*, vol. 198, no. November 2023, p. 122967, 2024.
28. J. Schad, M. W. Lewis, S. Raisch, and W. K. Smith, "Paradox Research in Management Science: Looking Back to Move Forward," *Acad. Manag. Ann.*, vol. 10, no. 1, pp. 5–64, 2016.
29. S. G. Joel West, "Challenges of open innovation: the paradox of firm investment in open-source software," *R D Manag.*, vol. 36, no. 6, pp. 319–331, 2006.
30. P. Oliveira and M. P. e Cunha, "Centralized Decentralization, or Distributed Leadership as Paradox: The Case of the Patient Innovation's COVID-19 Portal," *J. Chang. Manag.*, vol. 21, no. 2, pp. 203–221, 2021.
31. S. P. Klein, P. Spieth, and M. Söllner, "Employee acceptance of digital transformation strategies: A paradox perspective," *J. Prod. Innov. Manag.*, no. December 2023, pp. 1–23, 2024.
32. M. P. e Cunha and L. L. Putnam, "Paradox theory and the paradox of success," *Strateg. Organ.*, vol. 17, no. 1, pp. 95–106, Oct. 2017.
33. D. Miller, "Icarus paradox: How exceptional companies bring about their own downfall," *IEEE Eng. Manag. Rev.*, vol. 21, no. 2, pp. 80–88, 1992.

34. B. Dowds, *Depression And The Erosion Of The Self In Late Modernity*. London And New York: Routledge, Taylor and Francis Group, 2018.
35. D. M. Sherrer, A. D. Franklin, S. J. Kimatian, I. H. Black, and M. H. Tsai, "The Icarus Paradox and the Future of Anesthesiology," *Anesth. Analg.*, vol. 136, no. 1, pp. 185–189, 2023.
36. C. Biçer, "the Icarus Paradox in Management: How To Be a Well-Balanced Leader?," *Nevşehir Hacı Bektaş Veli Üniversitesi SBE Derg.*, vol. 11, no. 4, pp. 1891–1905, 2021.
37. F. Vermeulen, "Businesses and the Icarus Paradox," *Harvard Business Review*, 2009.
38. M. Zreik, "The Paradox of Educational Inequality in Indonesia: Socioeconomic Implications and Paths Towards Inclusion," *Socio-Economic Implic. Glob. Educ. Inequalities*, pp. 69–85, 2024.
39. R. Winzer, L. Lindberg, K. Guldbrandsson, and A. Sidorchuk, "Effects of mental health interventions for students in higher education are sustainable over time: a systematic review and meta-analysis of randomized controlled trials.," *PeerJ*, vol. 6, p. e4598, 2018.
40. L. S. Rotenstein *et al.*, "Prevalence of Depression, Depressive Symptoms, and Suicidal Ideation Among Medical Students: A Systematic Review and Meta-Analysis.," *JAMA*, vol. 316, no. 21, pp. 2214–2236, Dec. 2016.
41. J. Shapiro, "The Paradox of Teaching Empathy in Medical Education," in *Empathy: From Bench to Bedside*, J. Decety, Ed. The MIT Press, 2011.
42. T. Brown *et al.*, "Practice education learning environments: The mismatch between perceived and preferred expectations of undergraduate health science students," *Nurse Educ. Today*, vol. 31, no. 8, pp. e22–e28, 2011.
43. P. A. Tess, "The role of social media in higher education classes (real and virtual) – A literature review," *Comput. Human Behav.*, vol. 29, no. 5, pp. A60–A68, 2013.
44. A. Sivakumar, S. Jayasingh, and S. Shaik, "Social Media Influence on Students' Knowledge Sharing and Learning: An Empirical Study," *Education Sciences*, vol. 13, no. 7. 2023.
45. C. Wilson and V. McDarby, "Social Media and Mental Health," *Clin. Child Psychol. Psychiatry*, vol. 28, no. 1, pp. 157–160, 2023.
46. S. Firdos, S. Almulla, S. Aldossary, S. Al Hassan, and L. Aldhaif, "Exploring the Attitudes of Medical Students Towards Social Media and E-professionalism in Al-Ahsa, Saudi Arabia.," *Cureus*, vol. 15, no. 11, p. e48718, Nov. 2023.
47. K. Terry, F. Yang, Q. Yao, and C. Liu, "The role of social media in public health crises caused by infectious disease: a scoping review," *BMJ Glob. Heal.*, vol. 8, no. 12, p. e013515, Dec. 2023.
48. J. R. Ferreira, "Need for effective collaboration between medical education and the health services," *Educ. Med. Salud*, vol. 15, no. 2, pp. 154–168, 1981.
49. J. W. Creswell and J. D. Creswell, *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches*, Fifth Edit. SAGE Publications, Inc., 2018.
50. L. J. Tjahyana, "Studi Netnografi Pola Komunikasi Jaringan Komunitas Cryptocurrency Dogecoin Pada Twitter," *J. Komun.*, vol. 10, no. 1, pp. 16–37, 2021.
51. C. Ibrahim *et al.*, "The Sentiment Analysis of Indonesian National Library'S Twitter and Instagram," *Publ. Libr. Inf. Sci.*, vol. 5, no. 2, pp. 48–56, 2021.
52. S. S. Hutagalung, T. Kartika, and W. Suciska, "Media Monitoring znalysis of Government Image in Infrastructure Development in Indonesia," *J. Komun.*, vol. 15, no. 1 SE-Articles, pp. 212–227, Jul. 2023.
53. G. Punziano, C. C. De Falco, and D. Trezza, "Digital Mixed Content Analysis for the Study of Digital Platform Social Data: An Illustration from the Analysis of COVID-19 Risk Perception in the Italian Twittersphere.," *Journal of Mixed Methods Research*, vol. 17, no. 2. pp. 143–170, Apr-2023.
54. J. Choi and J. Xavier, *Digitalization of Public Service Delivery in Asia*, First edit. Tokyo: Asian Productivity Organization, 2021.

55. M. D. Lytras, A. Visvizi, and K. T. Chui, *Big Data Research for Social Sciences and Social Impact*. 2020.
56. F. Binsar and T. Mauritsius, “Mining of Social Media on Covid-19 Big Data Infodemic in Indonesia,” *J. Comput. Sci.*, vol. 16, no. 11, pp. 1598–1609, 2020.
57. Y. U. Lee, S. H. Chung, and J. Y. Park, “Online Review Analysis from a Customer Behavior Observation Perspective for Product Development,” *Sustainability*, vol. 16, no. 3550, 2024.
58. P. Limna, “The impact of NVivo in qualitative research: Perspectives from graduate students,” *J. Appl. Learn. Teach.*, vol. 6, no. 2, pp. 271–282, 2023.
59. K. Jackson and P. Bazeley, *Qualitative Data Analysis with NVivo, 3rd Edition*. 2019.
60. F. Binsar and N. Legowo, “Design of Cloud Computing Outpatient Registration Model Through SMS Messages at Hospitals using TOGAF ADM,” *Int. J. Recent Technol. Eng.*, vol. 8, no. 5, pp. 3857–3865, 2020.
61. R. Mustika, H. Nishigori, S. Ronokusumo, and A. Scherpbier, “The odyssey of medical education in Indonesia,” *Asia Pacific Sch.*, vol. 4, no. 1, pp. 4–8, 2019.
62. S. Zechariah, B. E. Ansa, S. W. Johnson, A. M. Gates, and G. De Leo, “Interprofessional Education and Collaboration in Healthcare: An Exploratory Study of the Perspectives of Medical Students in the United States.,” *Healthc. (Basel, Switzerland)*, vol. 7, no. 4, Oct. 2019.
63. B. Hofmann, “The paradox of health care,” *Heal. Care Anal.*, vol. 9, no. 4, pp. 369–386, 2001.
64. F. Binsar, I. E. Riantono, R. Kartono, A. Bandur, and W. Kosasih, “Gamification to Grow Motivation for Interactive Engagement of Health Nurses in Using Health Information Systems: A Conceptual Framework,” *Proc. Asia Pacific Comput. Syst. Conf. 2021. APCS 2021. Lect. Notes Electr. Eng. vol 978. Springer, Singapore*, vol. 978, pp. 99–120, 2023.

Authors

***Faisal Binsar**: Final year Doctor of Research in Management student with a focus on Entrepreneurship and Innovation. He completed his master's degree in Information Systems Management from BINUS University. His research interests in the field of digital business include e-commerce services, inventory management, and performance management. Apart from that, he actively participates in the implementation of digital technology for services in many hospitals, especially in the lower middle class in Indonesia.*

***Mohammad Hamsal**: Full Professor of Strategy and Agility at the BINUS Business School Management Science Doctoral Program and an administrator of the Indonesia Strategic Management Society. He is Head of Corporate Strategy and Agility, Knowledge Research Sector in the Doctoral Research Management (DRM) program, at Binus University. He frequently serves as a business and financial strategy advisor as well as an independent consultant for management strategy, business modeling, and organizational transformation with more than 20 years of experience. His expertise is corporate strategy, service quality, business sustainability, supply chain, organizational development, and human resources for the telecommunications, automotive, and banking industries.*