iJRASET
International Journal For Research in Applied Science and Engineering Technology



INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 13 **Issue:** XI **Month of publication:** November 2025

DOI: https://doi.org/10.22214/ijraset.2025.75589

www.ijraset.com

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International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.538
Volume 13 Issue XI Nov 2025- Available at www.ijraset.com

Smartphones as Tools for Academic Information Seeking: A Study among Medical Students at Rama Medical College, Hapur (U.P.)

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Abstract: ***Smartphones play an essential role in medical education by providing quick access to diverse medical resources. This study examined how medical students at Rama Medical College, Hapur, use smartphones for information seeking, academic support, and clinical tasks. Using a cross-sectional survey, data was collected on usage frequency, apps accessed, and purposes of use. Most students use smartphones daily for online textbooks, drug references, medical databases, and clinical decision-making. While smartphones enhance self-directed learning and immediate information retrieval, issues such as distractions and overdependence were noted. The study concludes that smartphones are valuable supplementary tools, and incorporating digital literacy and responsible usage guidelines into the medical curriculum can further optimize their educational and clinical benefits.***

Keywords: Smartphones, Information seeking, Rama Medical College, Medical professionals, Medical apps, Medical information, Digital literacy, Information sources, Digital information seeking, Mobile learning, Technology in education, E-learning tools

I. INTRODUCTION

The widespread adoption of information and communication technology (ICT) has had a significant impact on almost every aspect of human life. It is currently quite noticeable in the way that education is conducted. In the context, the emergence of mobile technology has been one of the major technological advances of the past few decades [1]. In the modern world, mobile phones especially internet-enabled smartphones are extremely important. Smartphones have rapidly revolutionized worldwide communication and information access. The easy access to the internet via smartphones has had a tremendous impact on the daily lives of young people and teenagers, especially in urban locations [1]. Smartphones, an amalgamation of mobile phone and minicomputer, allow you to browse the web and use online applications (Apps)[2].As a result of the widespread availability of these resources, students no longer exclusively rely on paper-based resources for their education. Smartphones became popular after the internet was introduced, allowing learning to occur regardless of time or place. Darko-Adjei states that “Due to their versatility, educators are integrating smartphone use in curriculum delivery, with an emphasis on the advantages and with amendments to curtail disadvantage” [3].

For medical college students, smartphones have become essential tools that have a big impact on their educational experiences and information-seeking habits. The utilization of mobile devices by health care professionals (HCPs) has altered several aspects of clinical practice [4].

Several apps are now available to assist healthcare workers and learners with a variety of important tasks, such as: information and time management; health record maintenance and access; communications and consulting; reference and information gathering; patient management and monitoring; clinical decision-making; and medical education and training [5].

Numerous studies demonstrate the complex roles that smartphones play in these students' academic lives, presenting both benefits and drawbacks. There have been only a few literatures on use of Smartphones by medical students for information seeking. Therefore, this study will look into the problem and evaluate the trend of medical students using smartphones to get the clinical information they need.

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II. AIM AND OBJECTIVES

The aim of this study is to understand how medical students use smartphones for their studies. This includes how they use phones for learning, doing research, and helping in clinical practice. The study also aims to find out the benefits of using smartphones, the problems students face, and how useful smartphones are in improving learning, remembering information, and developing skills. Additionally, the study will look at how smartphone use can be improved so that it supports medical education in a better and more effective way. To achieve this aim, the study focuses on several objectives. These include finding out how students use smartphones in their daily academic work, identifying the types of study-related tasks they perform on their phones, and examining the advantages and problems related to smartphone use. The study also aims to understand students' opinions about using smartphones for learning and to assess how helpful smartphones are in improving their overall educational experience. Finally, the study intends to suggest ways to make the use of smartphones more effective and supportive in medical education.

III. LITERATURE REVIEW

To build a comprehensive understanding of the research topic, it is crucial to explore existing studies and scholarly contributions. This section provides an overview of relevant literature to establish the foundation for the current study. Singh found that smartphones and medical education apps are being widely used by medical students and Universities should create a policy on the usage of smartphones for Pedagogical purposes ([6].In another study the investigator explored the benefits and drawbacks of smartphone use in clinical and medical educational environments. Smartphones appear to have a positive rather than negative impact on their ability to improve patient care and medical education [7]. The literature study conducted by Changazi observed that Medical graduates use smartphones primarily for academic purposes and clinical help. Pre-installed programs and reliable resources were commonly used as a learning medium [8]. Another study found that medical students and junior doctors are substantially more likely to own and use smartphones. They prefer to create new apps to enhance their study and clinical practice [9]. In a subsequent study the findings revealed that smartphones can be revolutionary in medical education if it used aptly. In India, the field of medical education has numerous issues with the use of cellphones, which can be overcome by specialized approaches [10]. Evidence from another study revealed that the majority of medical students believed that smartphones would be a useful addition to their education; however, financial constraints have to be addressed before smartphones can become more universally accepted, with some users reporting that smartphones are expensive and difficult to use [11]. In a parallel study it was discovered that, 'While technological and intellectual limits may not prevent medical trainees and professors from using cellphones to seek medical information, access barriers and a lack of awareness may limit their ability to use licensed resources from trusted libraries[12]. Another investigation found that the use of medical apps on smartphone devices is not common among medical students. Students were pleased about smartphones as an instructional tool [13]. Smartphone adoption is likely to increase as new advancements in design, medical apps, and educational materials are made available [14]. The current study also investigates the patterns, frequency, and effectiveness of smartphone using among medical students at Rama Medical College, Hospital, and Research Centre in Hapur, Uttar Pradesh, concentrating on its function in information searching, academic assistance, and clinical practice.

IV. RESEARCH QUESTIONS

Prior to beginning this study, we identified six areas of significance regarding the use of smartphone for information gathering by the students of Rama Medical College, Hospital & Research Centre, Hapur(U.P.).

1) Q1. How frequently do students of Rama Medical College, Hospital & Research Centre, Hapur(U.P.) use their smartphones?
2) Q2. For what purpose do students of Rama Medical College, Hospital & Research Centre, Hapur(U.P.) use their smartphones?
3) Q3. What types of information-seeking activities do students perform using their smartphones?
4) Q4. What are the barriers and obstacles do students of Rama Medical College, Hospital & Research Centre, Hapur(U.P.) encounter while using their smartphones for information seeking?
5) Q5.How smartphones do affect medical students' learning and research?
6) Q6.Do medical students and health professionals find smartphones beneficial for retrieving academic/clinical information?

V. METHODS

For the study, survey approach was used to collect data from a small number of respondents. The present study is limited to the scope of students/ Scholars/ health professionals using smartphone for their academic purposes in Rama Medical College, Hospital & Research Centre, Hapur (U.P.).

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The total of 1770 students has been currently enrolled in Rama Medical College, Hospital & Research Centre, Hapur (U.P.) in various courses such as MBBS with Internship (Five years) and PG-MD/MS (Three Years), from session 2019-2023(MBBS with Internship) and 2021- 2023 (PG-MD/MS). The data is collected in the month of October 2024 with the help of Questionnaire containing questions in both modes (say closed and open-ended). Simple Random sampling technique has been used for the study. The questionnaires were distributed to total 160 students in the college. Out of 160 invited medical students, 150 returned the questionnaire, making a turnover rate of 94% (approx). The data was collected and analyzed properly.

VI. RESULTS AND DISCUSSION

A. Demographic Profile of Study Participants

The demographic profile of the participants reflects representation from various years of the MBBS programme. A total of 10% (n=15) were in their first year, 20% (n=30) in their second year, 10% (n=15) in their third year, and 30% (n=45) in their final year, with no participants from the fourth year. Regarding age, the majority of respondents i.e. 90% (n=135) were below 30 years, while 10% (n=15) fell within the 30–40-year age group. In terms of gender distribution, 67% (n=100) of the participants were male, whereas 33% (n=50) were female (Table I).

TABLE I
DEMOGRAPHIC PROFILE OF THE PARTICIPANTS IN THE STUDY (n = 150)

Variables	Category	No. of participants	Percent (%)
MBBS year	1st	15	10
	2nd	30	20
	3rd	15	10
	4th	-	-
	Final/interns	45	30
PG(MD/MS)	1st	-	-
	2nd	15	10
	3rd	30	20
Age	Under 30	135	90
	30-40	15	10
Gender	Male	100	66.67
	Female	50	33.33

B. Patterns of use of Smartphone for Academic Purpose

It is assumed that all participants in the study own at least one smartphone. The usage pattern and frequency of smartphone use for academic purposes reveal that half of the respondents (50%, n=75) reported using their smartphones for 3-4 hours per day. Additionally, 20% (n=30) indicated using smartphones for 1-2 hours daily for academic activities. A smaller proportion say 10% (n=15) each reported using smartphones for less than one hour and for more than four hours per day, respectively (Table II).

TABLE II
FREQUENCY OF USE FOR ACADEMIC PURPOSE

Statement	UG (MBBS with Intern)	PG (MD/MS)	Total	Percent (%)
Less than 1 hour	-	15	15	10
1-2 hrs.	15	15	30	20
3-4 hrs.	45	30	75	50
More than 4 hrs.	15	0	15	10

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C. Sources of Information

The findings reveal the various information sources accessed by the participants through their smartphones. All respondents (100%, n=150) reported using smartphones to view videos and tutorial lectures. A significant proportion, 80% (n=120), used their smartphones for reading notes and slides, while 70% (n=105) accessed downloaded textbooks. In addition, 30% (n=45) of the participants each used their smartphones to retrieve research articles, access medical applications, and consult clinical guidelines (Table III)

TABLE III
SOURCES OF INFORMATION

Sources	UG (MBBS with Intern)	PG (MD/MS)	Total	Percent (%)
Textbook	75	30	105	70
Research Articles	0	45	45	30
Clinical Guidelines	15	30	45	30
Medical apps(e.g. drug references, calculators)	15	30	45	30
Lecture notes/Slides	105	15	120	80
Videos (Tutorials, lectures)	105	45	150	100

D. Type of Information Retrieves using Smartphone

The data indicates that all participants (100%, n=150) use smartphones to retrieve drug-related information. A large proportion i.e. 90% (n=135) also reported using smartphones to access information on diagnosis and treatment, as well as case studies. Additionally, 80% (n=120) used their smartphones to stay updated with recent medical research, while 60% (n=90) accessed information on medical procedures and guidelines. Only a small proportion, 10% (n=15), reported retrieving other types of information beyond the categories listed (Table IV).

TABLE IV
TYPE OF INFORMATION RETRIEVE USING SMARTPHONE

Types	UG (MBBS with Intern)	PG (MD/MS)	Total	Percent (%)
Diagnosis and treatment information	105	30	135	90
Drug information	105	45	150	100
Case studies	105	30	135	90
Recent medical research	90	30	120	80
Medical procedures and guidelines	90	0	90	60
Others	15	0	15	10

E. Library Resources using Smartphone

The results indicate the extent to which medical student's access library services at Rama Medical College, Hospital & Research Centre, Hapur (U.P.) through their smartphones. A large proportion of students about 90% (n=135) reported using the e-journals provided by the institute library, followed by 83% (n=125) who accessed e-books on their smartphones. In comparison, only 30% (n=45) used Web of Science, and 20% (n=30) accessed other library databases through their smartphones. Notably, none of the participants reported using the library's online consultation services via their smartphones. This finding highlights the need for the library staff to actively promote this service particularly through orientation programmes to ensure better awareness and optimal utilization (Table V).

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ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.538
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TABLE V
ACCESSING LIBRARY RESOURCES USING SMARTPHONE

Library Services	UG (MBBS with Intern)	PG (MD/MS)	Total	Percent (%)
e-Books	90	35	125	83
e-Journals	105	30	135	90
Library database (e.g., PubMed, Ovid)	15	15	30	20
Online consultation services	0	0	0	0
Web Science (Cleveland Clinical Center for Continuing Education)	30	15	45	30

The above results are very similar to a prior study in which the investigator found that "Medical students use smartphones for accessing diverse resources such as learning anatomy, drug information, clinical scoring systems, and eBooks" [15].

F. Effectiveness of Smartphone

The findings indicate that smartphones are perceived as highly effective academic tools among medical students. A large majority of about 80% (n=120) respondents reported that smartphones are very effective for retrieving academic information, largely due to their portability, which allows students to access information anytime and anywhere. The remaining 20% (n=30) expressed a neutral view, and none of the participants regarded smartphone use as ineffective or very ineffective (Table VI). These results are consistent with previous research, for instance, studies by Zhao and Maudsley similarly observed that students who use smartphones and medical applications believe that these devices have a positive impact on their education [16][17].

TABLE VI
EFFECTIVENESS OF SMARTPHONE USE FOR ACADEMIC PURPOSE

Statement	UG (MBBS with Intern)	PG (MD/MS)	Total	Percent (%)
Very ineffective	0	0	0	0
Ineffective	0	0	0	0
Neutral	15	15	30	20
Effective	45	15	60	40
Very Effective	45	15	60	40

G. Impact on Learning

A substantial majority of the medical students of about 90% (n=135) reported that using smartphones to retrieve academic information has a positive impact on their academic performance. They attributed this to the portability, constant availability, and ease of use offered by smartphones. In contrast, 10% (n=15) remained neutral regarding this benefit (Table VII). These findings align closely with previous research, which also reported a positive association between smartphone use and academic performance among medical students [18].

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TABLE VII
IMPACT OF USING SMARTPHONE ON ACADEMIC PERFORMANCE

Statement	UG (MBBS with Intern)	PG (MD/MS)	Total	Percent (%)
Positive impact	90	45	135	90
Negative impact	0	0	0	0
Neutral	15	0	15	10

H. Distraction While using Smartphone for Academic Purposes

A majority of the students, accounting for 60% (n=90), reported feeling distracted while using smartphones for academic purposes. In contrast, 20% (n=30) stated that they rarely experienced distraction, and an equal proportion, 20% (n=30), indicated that they often faced distraction during smartphone based academic activities (Table VII)

TABLE VIII
DISTRACTION WHILE USING SMARTPHONE FOR ACADEMIC PURPOSES

Statement	UG (MBBS with Intern)	PG (MD/MS)	Total	Percent (%)
Never	0	0	0	0
Rarely	0	30	30	20
Sometimes	90	0	90	60
Often	15	15	30	20
Always	0	0	0	0

I. Preference of Smartphone over other Devices

The findings show that a majority of the participants (60%, n=90) prefer using smartphones over other devices due to their ease of handling and portability. In contrast, 30% (n=45) indicated that they do not prefer smartphones for this purpose, while the remaining 10% (n=15) expressed a neutral opinion (Table IX)

TABLE IX
PREFERENCE OF SMARTPHONE OVER OTHER DEVICES

Statement	UG (MBBS with Intern)	PG (MD/MS)	Total	Percent (%)
Prefer	70	20	90	60
Not Prefer	30	15	45	30
Neutral	11	4	15	10

J. Limitations of using Smartphone for Learning Purposes

The results reveal notable concerns among medical students regarding the adverse effects of smartphone use on their health and academic performance. All respondents (n=150) indicated that excessive smartphone use is associated with various health-related problems. In addition, a large proportion, about 77% (n=115), agreed that it contributes to poor sleep and insomnia. Around 70% (n=105) stated that smartphone use increases distraction levels, while 47% (n=70) felt that it promotes superficial learning. Furthermore, approximately 33% (n=50) of the students agreed that smartphone use can lead to accessing unreliable information and may also result in poor academic outcomes (Table X).

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TABLE X
LIMITATIONS OF USING SMARTPHONE FOR LEARNING PURPOSES

Statement	UG (MBBS with Intern)	PG (MD/MS)	Total	Percent (%)
Unreliable information	30	20	50	33
Higher distraction Level	90	15	105	70
Poor Sleep/insomnia	90	25	115	77
Superficial Learning	60	10	70	47
Poor academic outcomes	50	0	50	33
Other health issues	105	45	150	100

The aforementioned findings are similar to the other studies conducted by various researchers who determined that "Smartphone use also has limitations which may include superficial learning, use of unreliable information sources, worsened psychological well-being, insomnia, poor sleep quality, anxiety, depression, low self-esteem, higher cognitive distraction, smartphone addiction, poorer academic outcomes and concerns related to privacy and professionalism" [19][15][20][21][22][23].

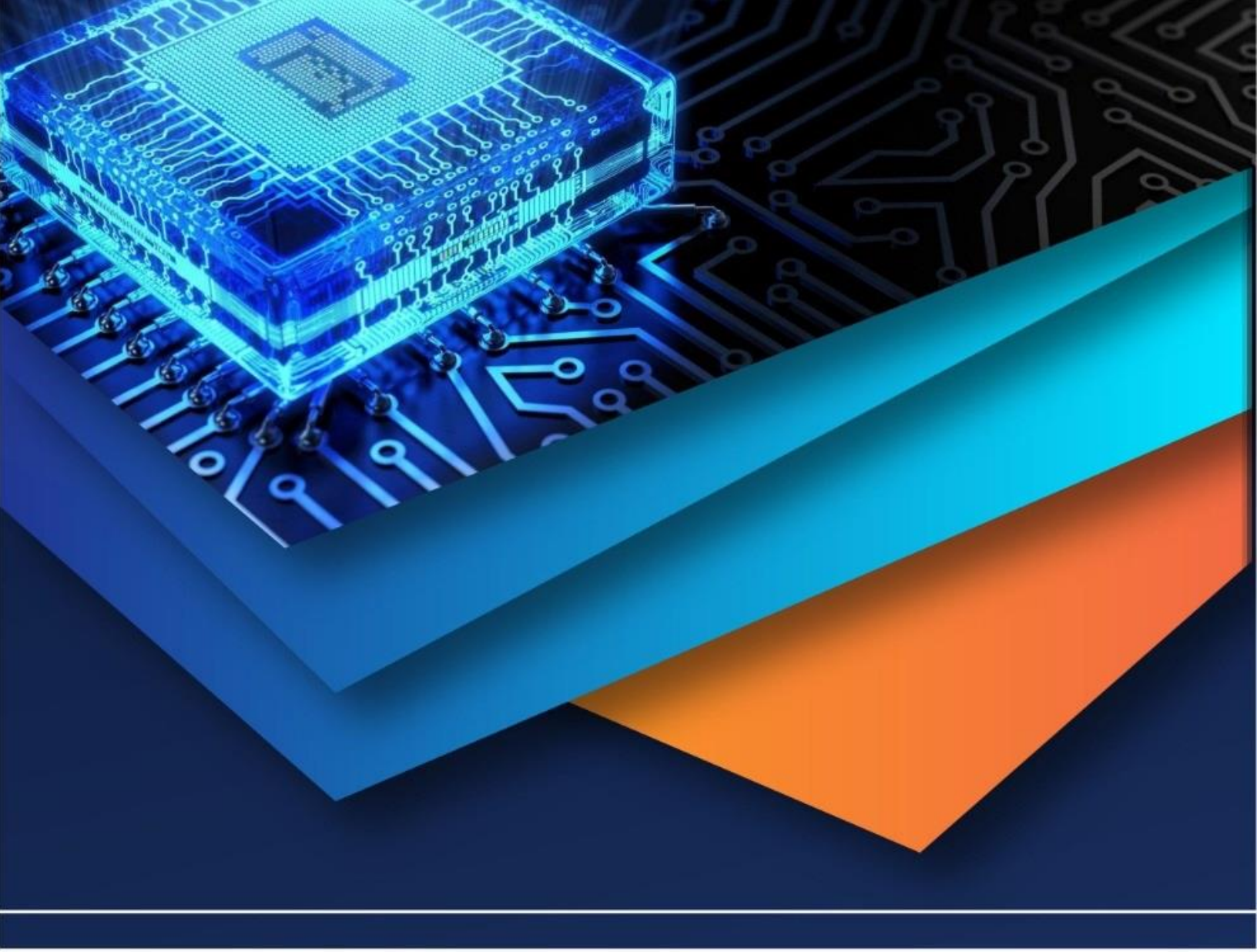
VII. CONCLUSION

The study concludes by suggesting that the use of smartphones by medical students for academic purposes has become an integral part of modern medical education. Smartphones offer quick access to reliable information, support efficient communication, and enhance learning through diverse educational apps, online resources, and multimedia content. They facilitate collaborative learning and keep students up-to-date with medical advancements and research, contributing to more informed and prepared future healthcare professionals. However there is a concern of higher distraction rate while using smartphones for academic purpose but the use of smartphones is quite effective in increasing academic performance. However, to maximize benefits and minimize distractions, it is essential for students to develop effective time-management skills and maintain a balanced approach in their smartphone usage. Proper guidance and integration of smartphones in academic curricula can further enhance their potential as valuable tools in medical education, ultimately fostering better learning outcomes and promoting a more adaptive learning environment. Libraries may also play a pivotal role in promoting the effective use of smartphones among students by offering guidance on educational apps, digital resources, and responsible usage. They can provide workshops and curate content to help students utilize their devices for academic growth and skill development.

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