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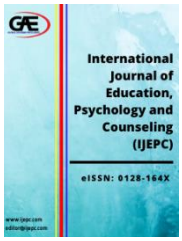

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FLIPPED LEARNING BY GOOGLE APPS IN SUPPORTING LEARNING AND TEACHING DURING PANDEMIC IN OMAN

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Abstract:

The research study is commonly delivered using the traditional lecture format, followed by a question and answer session with students. Another approach is to divide students into groups, assign them themes to discuss, and then have them present the issues one by one. This learning technique, however, is not appropriate for use during a pandemic. In this study, students achieve the desired purpose of learning activities by utilizing the Active Learning approach and instructional strategy using Google Apps Learning Approach. Instructors can meet and talk with students both in-person and through the online system. This method is well-known as the Flipped Learning. This goal can be demonstrated by students arriving on time for individual discussion activities, explaining the topic, listening to other members' explanations, participating in conversations, exhibiting critical thinking, and leading physical or online discussion activities. However, because this activity takes place online, there are a number of challenges to overcome during the implementation phase, including internet network issues, data constraints, and device specs that do not allow learning activities—this study involved a total of five postgraduate students. This study was done from February to May 2022. The prior study used the questionnaire and got the expert's permission. The study was evaluated using descriptive quantitative statistics including standard deviation, percentage, frequency, and score. According to the report, students' average level of difficulty with Google Apps is 3.82.

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Keywords:

Flipped Learning, Google Apps, Teaching, And Learning, Oman

Introduction

Traditional computer science teaching for research field is no longer relevant, especially for courses that need discussion or case studies. Research for postgraduate student is one of critical issues that necessitates interaction between students as well as between students and professors. However, during a pandemic, this scenario is not implemented 100% in order to prevent the virus spread (Zulkefli et al., 2020). Even though the pandemic is over, precautions are still needed and due to that, Flipped Learning is one of the best learning methods that can be used to support the research activities and studies (Nerantzi, 2020; Chou et al., 2021; Umar & Ko, 2022).

Flipped learning refers to situations in which students are required to participate in in-class activities such as discussion in class (Susana & Brahma, 2021). Flipped learning are a type of teaching that involves actively engaging students with course material through conversations, problem-solving, case studies, role plays, and other techniques (Rotellar & Cain, 2016). The lecturer uses Flipped learning methodology and instruction methods in the topic by making online video and shared to the student to guarantee that students participate in all of the research activities. Traditionally, the lecturer will assign exercises for the students to complete, and the students will be responsible for submitting the exercises. Students are often given assignments to deliver during class. This semester, instructors employ Flipped learning strategies that make effective use of Google Apps in Education, such as Google Docs, Google Excel, and Google Jamboard. Assessing the use of Flipped Learning in Oman's higher education institutions in terms of its functionality, ease of access, analytical, portable design, confidentiality, data security and rights, social engagement, and cognitive presence is the purpose of this research as well as to know the impact of research in the pandemic.

Literature Review

Pandemic

The first case of COVID-19 was found in late December 2019 in Wuhan, China (Zu et al., 2020). Since early January 2020, everyone has been informed about the newly discovered COVID-19 virus. In the month of January, the world descends into anarchy, the number of countries reporting positive cases skyrockets, and there are no safeguards in place to protect humanity from this virus. In February, China placed Wuhan under quarantine in an effort to prevent the virus from spreading further (Qianying et al., 2020). COVID-19 rapidly disseminated and infected people in a wide variety of nations in a short amount of time. Movement Control Orders (MCOs) and lockdowns were enforced by the governments of various countries as the virus continued to spread. These measures had an effect on a wide range of businesses, including education, tourism, and the financial sector (Kavaljit, 2020). Due to the COVID-19 pandemic, most of the education sector changes the education from face to face to online learning. Some nations plan to treat COVID-19 like other endemic illnesses over two years into the outbreak. Since then, schools are open and accepting students. Many institutions take efforts to avoid viral transmission. Some institutions maintain online courses for non-face-to-face disciplines to avoid this. It's hard and lowers teaching quality. Students

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may struggle to grasp courses. To sustain face-to-face and online classrooms, instructors and teachers might use the flipped learning approach. Flipped learning is a popular secondary and higher education approach. In a flipped classroom, students watch digitized or online lectures as pre-class homework and use class time on active learning activities including discussions, calculations, and group activities. This technique "flips" the traditional presentation of knowledge, where lectures and example problems are given in class and problem sets or group projects are assigned as homework.

Online Learning

Within two months of the COVID-19 spreading, both countries began offering online education. Critics claim that prior to the implementation of online education, substantial planning is required. Learning using the internet is not a novel idea, particularly in the realm of higher education (Soffer et al., 2018). It is a method that is frequently employed in illustrious establishments. Students from all around the globe can take advantage of free online classes provided by some educational institutions like the Massachusetts Institute of Technology (MIT) (MIT). Karhikeyan, et al., (2019) mentioned that using video conferencing software such as Google Meeting, Zoom, and BigBlueButton which are available on online learning platforms, may now makes teacher to instruct students in real time. This is a significant advancement in the field of education. The lecturers may choose to share the displays of their laptops or other computers with the students while they are teaching. Additionally, students have the ability to make direct contact with the instructor using video and audio capabilities in order to pose questions or participate in conversations. There are additional online quizzes and exam systems available. Gamification learning is also used by many teachers to help pupils comprehend specific topics (Ishak et al., 2020). By incorporating these technologies into the online learning environment, they assist classroom teaching.

Many universities have simply used the online learning platform as a supplement to their traditional learning methods (Zulkefli et al., 2020). According to previous research, teachers and students, particularly in underdeveloped nations, are unfamiliar with the technologies. Furthermore, not all universities have the necessary resources to enable online learning. A quick, dependable, user-friendly, and low-cost online learning system that is also efficient in application is required for a wide variety of courses (Muljana et al., 2019; Vaganova et al., 2020).

Flipped Classroom for Conducting Research

One strategy that can be used to adapt while investigating pandemics is flipped learning. In this study, the researcher communicated with postgraduate students using Google Apps in Education, such as Google Docs, Google Excel, and Google Jamboard. Google Apps in Education is a user-friendly cloud-based platform that is free to use. Many Internet users are familiar with Google. Mobile phones, PCs, and laptops can all run Google software. In addition, Google Apps is one of the learning management systems (LMS) that is easiest to use since the interface is intuitively designed for both instructors and students (Vaganova et al., 2020). Google Apps are also available for download and installation on mobile devices. Videos and teaching materials can be accessed instantly as long as students and teachers have access to the Internet. Project-based Learning, Centred-Based Learning (CBL), and Project-based Learning are all supported by Google Apps (Rachel et al., 2015). Teachers may simply manage online classes using Google Apps organization tools

Research Methodology

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An online questionnaire was used to collect data from five students for this investigation. The purpose of the survey was to find out the students' attitudes on the utilization of Google Apps as a component of their communication during online learning. This study used Google Docs, Google Sheets, and Google Jamboard as our primary Collaborative Online Teaching Tools for the Flipped learning process. All students must use their accounts to access the applications. Some learning occurs in the classroom, while others occur outside of the classroom. Students are taught how to utilize the applications at first and students are also taught how to utilize the applications in real-time, particularly Google Docs and Google Jamboard. Students are sometimes assigned discussion ideas for Literature Reviews, which they must post on Google Jamboard. Each student is given a certain task. In every employment, for example, they are allocated to become a manager, tester, developer, designer, or any other capacity. These positions will prepare students to work as researchers in the real world. He/she will play his/her parts if one of his/her pals makes a mistake or need assistance. Meanwhile, their teacher can monitor their development in real time.

This study employs quantitative research by asking students to evaluate Google Apps via a survey on Google form. The description of each criteria is explained to the students or responders. In the survey, nominal scale is used with four points, ranging from one (not applicable) to four. Inferential and descriptive statistics by SPSS Statistics were used to analyse all of the data. All of the respondents are male students' research graduate student from the course. Figures 1 and 2 show how Google Apps may be used to conduct research among postgraduate students, with Google Jamboard and Google Docs being used to debate research issues and case studies. Meanwhile Google Sheet is used as a real-time database for the Systematic Literature Review data. The survey questionnaire was based on a seven-category rubric for e-learning Tool Evaluation (Anstey et al., 2018), which is shown in Table 1. Not all of the rubric's criteria were applied to evaluate Google Apps in this study.

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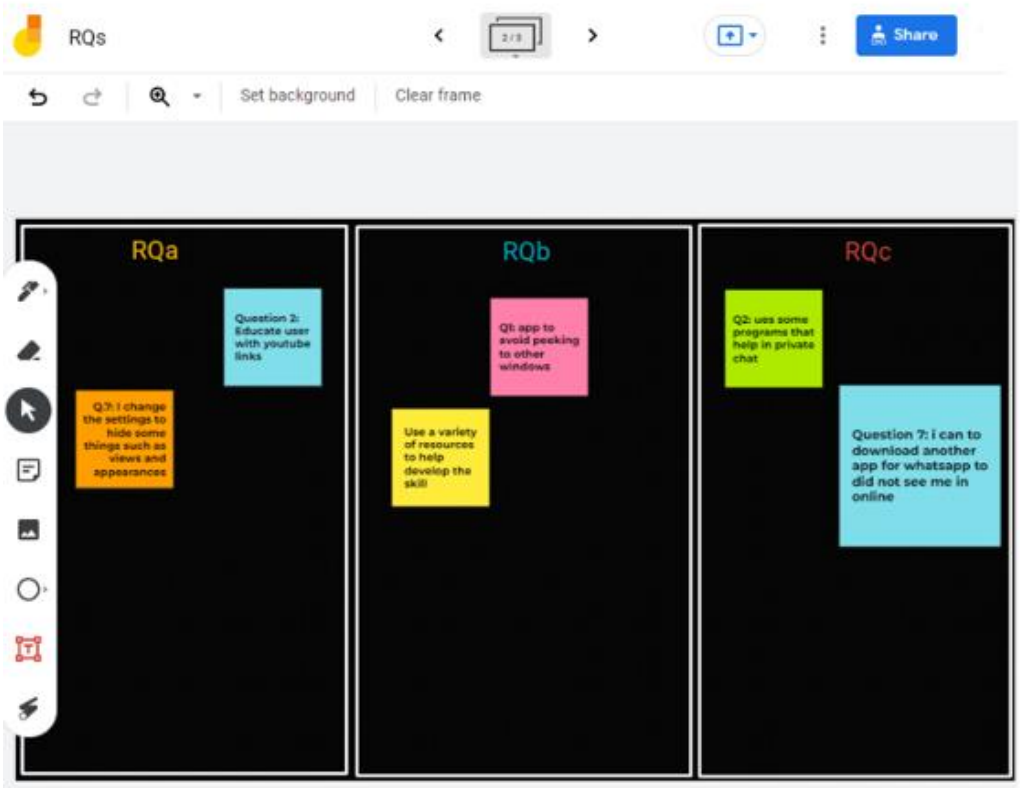

Figure 1: Example of Google Jamboard in Research Question Activities

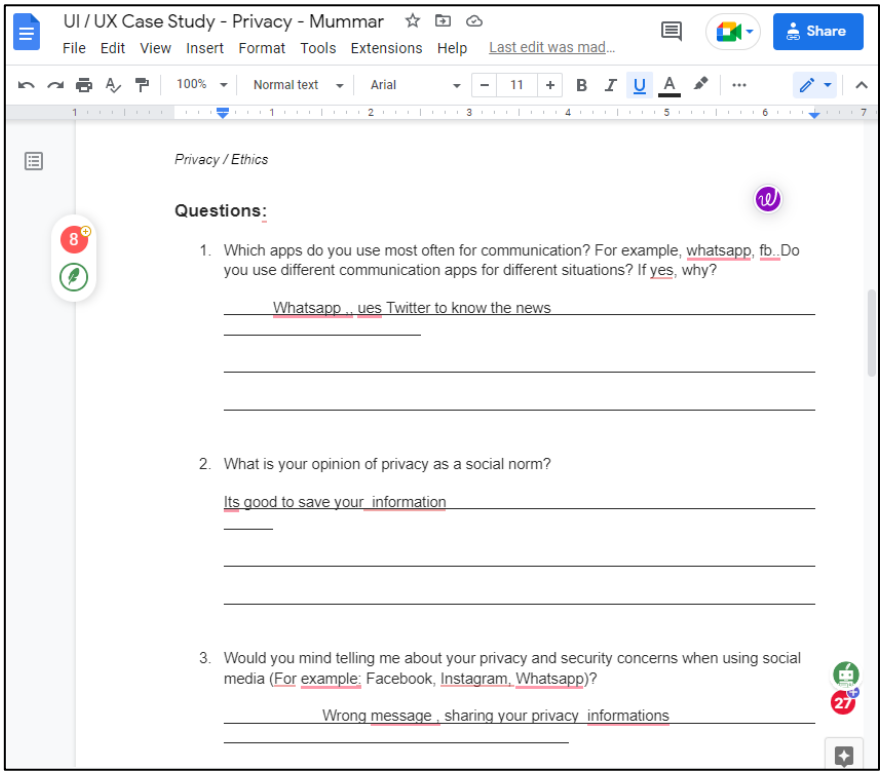

Figure 2: Google Docs for Case Study by The Student

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Table 1: Evaluation Criteria For The Use Of E-Learning Tools

Category	Criteria
Functionality	• Scale • Ease of Use • Tech Support / Help Availability • Hypermediality
Accessibility	• Accessibility standards • Cost of Use • User-focused participation • Required Equipment
Technical	• Browser • Integration/ Embedding within a Learning Management System (LMS) • Desktop/ Laptop Operating Systems • Additional Downloads
Mobile Design	• Access • Functionality • Offline Access
Privacy, Data Protection, and Rights	• Sign Up/ Sign In • Data Privacy and Ownership • Archiving, Saving, and Exporting Data
Social Presence	• Collaboration • User Accountability • Diffusion
Teaching Presence	• Facilitation • Customization • Learning Analytics
Cognitive Presence	• Enhancement of Cognitive Task(s) • Higher-Order Thinking • Metacognitive Engagement

Analysis and Discussion of Study

According to what is displayed in Table 2, the interpretation of the mean scores in this inquiry was based on (Hamzah et al., 2016). The next sections include the students' average score and a full examination of the e-learning tools evaluation.

Table 2: Interpretation of Mean Scores

	Level	Mean
1	Very low	1.00-1.80
2	Low	1.81-2.60
3	Moderate	2.61-3.40
4	High	3.41-4.20
5	Very High	4.21-5.00

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Functionality

In this area, functionality refers to the identification of a tool's processes in addition to the condition or applicability of these functions to the intended plan. Table 3 shows the students' thoughts on Google Apps' functionality as an online learning tool. The highest mean score is 4.00 for the both criteria "The tool can be scaled to accommodate any size class with the flexibility to create smaller sub-groups or communities of practice," and "The tool has a user-friendly interface". Students' attitudes about adopting e-learning technologies may be influenced by their satisfaction with LMS (Liaw, 2008; Theresiawati et al., 2020).

Table 3: Functionality of E-Learning

Category	Criteria	Mean	Standard Deviation	Interpretation
Functionality	Ease of Use: The tool has a user-friendly interface, and it is easy for instructors and students to become skillful within a personalized and intuitive Manner.	4.00	0.00	High
	Technical Support / Help Availability: Campus-based technical support and help documentation are readily available and aid users in Troubleshooting tasks or solving problems experienced; the tool provider offers a robust support platform.	4.00	0.00	High
Overall Score		4.00	0.00	High

Accessibility

The usage of an e-learning tool, according to Universal Design for Learning (UDL), needs a curriculum design that is pliable and adaptive, allowing for a range of learning styles and guaranteeing that all students participate (Anstey et al., 2018). As a result, certain phrases are sanctioned for usage in achieving certain accessibility criteria for students with disabilities.

According to the data in Table 4, the criteria "necessary equipment" gets the highest mean score of 3.8. This suggests that the majority of students believe Google Apps does not need any particular hardware. According to the conclusions of this study, having access to a learning management system (LMS) with basic resources improves students' overall experience of online learning. The findings support the findings of a more recent study by Hamad (2020), which found that having access to a learning management system improved the user's usage of an e-learning tool.

The component known as "cost of usage" has the lowest mean score in the category, averaging 3.40 points. The conclusion is in line with the fact that the great majority of students who live outside of the city have limited Internet connection. According to a previous research, Google Apps consumes far less data than its competitors' learning management systems (LMS). The most major problem connected with remote education, according to a prior research by Lee et

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al. (2020), is the constraints imposed by internet connectivity, which may make e-learning less accessible. To solve this challenge, educators, educational institutions, and the government must work together to build a learning management system (LMS) that uses the internet at the lowest feasible cost. According to Al Kurdi et al. (2020) e-learning may be made more successful by upgrading its core components in order to get better results.

Table 4: Result of an Evaluation Based on Accessibility

Category	Criteria	Mean	Standard Deviation	Interpretation
Accessibility	Cost of Use: All aspects of the tool can be used free of charge.	3.40	0.80	Moderate
	Required Equipment: Proper tool use does not require equipment beyond what is typically available to instructors and students (computer with built-in speakers and microphone, internet connection, etc.)	3.80	0.40	High
Overall Score		3.60	0.60	High

Mobile Design

The number of diverse mobile devices, instructional methodologies, and assessment systems that leverage mobile technology to provide information will expand. Mobile technology will be included in the assessment area as a result of this. Table 5 shows that "access" is a critical component of mobile-friendly e-learning systems. This criterion has the highest average, which is 4.00. The lowest average for functionality is 3.60, which is based on the various Google Apps interface designs for mobile and desktop. This indicates that the mean is the lowest score attainable. This is an important component that contributes to students having a more favorable experience when studying online. The great majority of students prefer mobile phones to desktop PCs and laptops. The mobile phone's improved speed, reliability, and convenience account for this choice. Expanded support for mobile learning technologies improves students' overall satisfaction with their online learning (Syafi'i, 2020).

Table 5: Mobile Design Evaluation

Category	Criteria	Mean	Standard Deviation	Interpretation
Mobile Design	Access: The utility may be accessible by app or mobile browser, independent of	4.00	0.00	High

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	operating system or device. The mobile tool's design addresses screen size.			
	Functionality: There is little to no functional difference between the mobile and desktop versions, regardless of the device used to view it.	3.60	0.49	High
	Core tool features may be used offline, keeping functionality and information.	3.60	0.49	High
Overall Score		3.73	0.33	High

Design, Privacy, and Data Protection

E-learning platforms provide a variety of advantages, but they are not without a few downsides as well. Intellectual property (IP) and the security of user data are two of the most pressing concerns about learning management systems (LMS). According to the findings shown in Table 6, the criterion known as "Sign Up/ Sign In" has been given the highest possible mean score of 4.00 in the subcategory known as "Privacy, Data Protection, and Design." This conclusion highlights the user-friendliness of Google Apps, which includes a straightforward approach for logging in and quick access to files. The mean score for the criterion "Archiving, Saving, and Exporting Data" is 3.60, which is the lowest possible value. Because Google Apps is connected to Google Drive, students have a much simpler time accessing older files stored on Google Drive than they do when using other learning management systems. The students struggled with the process of "archiving, preserving, and exporting data" when they used Google Apps since they had only a limited amount of expertise with Google technology.

Table 6: The Outcome of the Evaluation with Regard to the Category of Rights, Privacy, and Data Protection

Category	Criteria	Mean	Standard Deviation	Interpretation
Privacy, Data Protection, and Rights	Sign Up/ Sign in: Use of the program does not need an external Account or login, and no user information is collected or shared.	4.00	0.00	High
	Data Privacy and Ownership: Users preserve ownership	3.60	0.49	High

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	and copyright of their intellectual property/data; they determine if/how data is shared. Users may archive, store, or export content or activity data in various formats.	3.60	0.49	High
Overall Score		3.73	0.37	High

Social Presence

Within the context of an online learning environment, this discussion focuses on the ways in which a sense of community may be formed and sustained among students. Garrison (2011) states, "the capacity of participants to project their attributes into the community, therefore presenting themselves to the other members as real persons," social presence is defined as "the ability of participants to show themselves to the other members as genuine people." The establishment of a safe and reliable setting that fosters cooperation and teamwork is the primary goal of this initiative.

In this section, the views of the students are solicited about the capability of Google Apps to support both asynchronous and synchronous collaboration. The average score comes in at 3.77 as seen in Table 7. The results suggest that maintaining a social presence while using Google Apps is essential. Previous studies have shown that Google Apps is the most popular platform for collaborative e-learning (Syafi'i, 2020), and our conclusion is in line with other findings. Additionally, the social presence of Google Apps is reliable for communication between students (peer interaction) and instructors.

Table 7: Social Presence Evaluation

Category	Criteria	Mean	Standard Deviation	Interpretation
Social Presence	Collaboration: The technology supports a learning community via asynchronous and synchronous communication, interaction, and meaning transmission.	4.00	0.00	High
Overall Score		4.00	0.00	High

Cognitive Presence

The last factor that will be investigated is the cognitive presence. The term "cognitive presence" comes from the phrase "the process of inquiry that moves from problem characterization

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through discovery of relevant knowledge and ideas, integrating those ideas into a meaningful framework or solution" (Hamzah et al., 2016). This process begins with the characterization of the problem and moves on to the discovery of relevant knowledge and ideas. This category acknowledges the capacity of a tool to assist students in becoming cognitively engaged in the activities associated with learning.

In the "cognitive present" category, Table 8 demonstrates that the criteria for "metacognitive" have the highest mean score of 4.00. This research represents the many characteristics of Google Apps, including collaborative e-learning tools, real-time feedback from instructors, and real-time conversation with peers while working on projects. These aspects are all reflected in this study.

Table 8: Cognitive Presence Evaluation

Category	Criteria	Mean	Standard Deviation	Interpretation
Cognitive Presence	Higher-Order Thinking: The tool's design, facilitation, and instructor direction enhance higher-order thinking.	3.80	0.40	High
	Metacognitive Engagement: Learners may get formative feedback using the tool (i.e., they can track their performance, monitor their improvement, and test their knowledge)	4.00	0.00	High
Overall Score		3.90	0.20	High

Google Apps Overview

This section summarizes the research categories. Functionality, accessibility, technological improvements, mobile design, personal data security, social presence, and cognitive presence were considered. Table 9 shows that the overall mean is 3.82. According to the data, the majority of students saw Google Apps as a valuable learning management system (LMS) tool. According to the findings of the study, incorporating Google Apps into online education leads to improved academic performance on the part of students. According to a prior study (Lee et al., 2020), the categories and criteria for assessing LMS provided in Table 1 do not represent an entire list of those that are available. It's possible that certain criteria and categories were overlooked, but there may have been others.

Table 9: Overall Mean Evaluation Results

Category	Mean

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Functionality	4.00
Accessibility	3.60
Mobile Design	3.73
Privacy, Data Protection and Rights	3.73
Social Presence	4.00
Cognitive Presence	3.90
Overall	**3.82**

Conclusion

This research explored the views of students about the usefulness of Google Apps in the process of doing research. According to the collected data, the vast majority of students believed Google Apps to be beneficial on account of its functionalities, mobile design, and presence in technical, social, and cognitive realms. Even though Google Apps is a free, web-based and cloud-based learning management system (LMS) with features and tools that improve students' education. Improving students' experiences with online learning will require overcoming a number of challenges in the near future. These challenges include increasing internet speed and coverage, instructing students in information technology skills, and incorporating additional categories and aspects into LMS evaluation.

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