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Knowledge And Perceptions Of Astronomical Events Among Students Of Hassan Usman Katsina Polytechnic, Katsina, Katsina State Nigeria

Suleiman Iguda Ladan^{1*}, Saifullahi Ibrahim Badaru² & ³Bilkisu Usman Mutawalli

^{1,2,3}Department of Basic and Applied Sciences

College of Science and Technology

Hassan Usman Katsina Polytechnic, Katsina, Katsina State, Nigeria

*Corresponding author e-mail: suleiguda@hukpoly.edu.ng

ABSTRACT

Astronomy is a branch of natural science that deals with the study of the universe and the objects that exists naturally in space such as the moon, the sun, planets and stars. Over the years astronomical events such as lunar eclipse, solar eclipse and the falling of meteorites etc have been occurring in different parts of the world and how such events are viewed depend largely on the knowledge and perception among the citizens. This poster examines knowledge and perception of astronomical events with particular reference to the Friday 27th July 2018 lunar eclipse, among students of Hassan Usman Katsina Polytechnic, Katsina Katsina State. The selection of a Polytechnic for the study is apt as the Polytechnics are science and technology based institutions that play a critical role in the technological advancement of the country. Data for the research were generated using structured questionnaire survey conducted on two sets of students studying National Diploma Science Laboratory Technology and National Diploma Mass Communication numbering one hundred (100).The results have shown a varying degrees of knowledge of the lunar eclipse as the Mass Communication students depict an average while the Science Laboratory Technology students depict above average knowledge. The overall results showed that the respondents on the average have a score of 53.18% on the knowledge of astronomical events which is can be graded as good. In terms of the perception of the event only a small percentage of the students perceive the event as a normal astronomical event that occurs from time to time. It is therefore recommended that efforts should be made towards improving the students' knowledge of astronomical events and right perception of the event as experienced in Nigeria.

Keywords: Knowledge, perception, astronomical events, students, Katsina.

INTRODUCTION

Knowledge is the fact or condition of knowing something with familiarity gained through experience, education or association (Webster, 2024). It is the acquaintance with or understanding of a science, art or technique about subject areas or disciplines (Webster, 2024). Perception on the other hand is the ability to see or become aware of something or an event through the senses (Cambridge, 2024). It is the way in which something is regarded, understood or interpreted. Knowledge and perception of events can be products of education, personal experiences or places were humans live on the surface of the Earth.

Astronomical events are celestial body events such as eclipses, novae or planetary collision studied by the scientific discipline of Astronomy (Stuff, 2024). While some astronomical events are commonplace, others are so rare that they may never occur during a lifespan or even the lifespan of the next generation (ACI, 2024). Astronomical events have been occurring throughout the history of the planet Earth. The frequency or otherwise of witnessing an event depends primarily on location of a country or continent on the surface of the Earth. For example, meteoritic stones have frequently fallen from space in Lesotho and a research team from the University of Lesotho collected over 400 different stones ranging from just a few grams to over a kilogram in 2003 (Ambrose, 2003).

Nigeria, located in West Africa has witnessed series of astronomical events in the last few decades. The events include lunar eclipses, solar eclipses, falling of meteorites in some States of the federation. For example, the falling of meteorites from space has been witnessed in Maigatari Local Government, Jigawa State in 2004, Demsa Local Government, Adamawa State in 2006, Sokoto South Local Government, Sokoto State in 2008 and Zaki-Biam Local Government, Benue State in 2010 (Ladan, 2015). In the 21st century, three times Nigerians witnessed an eclipse on March 29, 2006, a total solar eclipse was experienced in eight states, on November 3, 2013, a partial eclipse was visible in some cities and on July 27, 2018, a lunar eclipse occurred (Iwalaiye, 2024). According to the Nigerian National Space Research and Development Agency (NASRDA), the lunar eclipse in Nigeria began at 6:44 p.m. as a partial eclipse and progressed to a total eclipse at 7:30 p.m (Iwalaiye, 2024).

An eclipse is an astronomical event where one celestial body moves into the shadow of another and this occurs as celestial bodies such as the sun, the moon and the Earth travels in space (Ahmad, 2010). There are two types of eclipses which are solar or eclipse of the sun and lunar or eclipse of the moon. An eclipse of the moon occurs when the moon passes into the cone of the shadow cast by the Earth. If the moon partially enters this cone, there would be partial eclipse. But if it enters wholly the cone the eclipse is said to be total (AbdulHamid, 2008). The most common type is a solar eclipse, where the moon casts its shadow on Earth, blocking the sun's light. Less common but still observable are lunar eclipses, where the Earth casts its shadow on the moon (Iwalaiye, 2024). These eclipses can be seen from anywhere on Earth where the moon is above the horizon. The moon may turn dark or red during a lunar eclipse.

Some studies have been conducted on Astronomy and astronomical events in Katsina State, northern Nigeria. Lugga (2014) studied the issue of moon sighting for the commencement of the Muslim fasting month of Ramadan and marking of eid-el-fitr on the first day of the month of Shawaal. The results show that the controversies that trailed the sighting of the new moons of Ramadan and Shawwal 1435 Hijrah (2014 CE) were the most unfortunate in the history of moon sighting in Nigeria. The study proffered some solutions to the moon sighting recurring controversy especially as it concerns the major bones of contention of eye-sighting versus the astronomical and the computer imagery projections.

Ladan, (2015) studied the relevance of studying Astronomy in Islamic Universities of Nigeria with particular reference to Alqalam University Katsina. The results found out that an understanding of the discipline of astronomy is essential for the appreciation of the religion of Islam; the knowledge of astronomy can be used to effectively serve Islam and the study of astronomy enables a Muslim to appreciate the oneness of Allah who created the heavens, sun, and moon as indicated in many verses (*Surahs*) in the Quran.

Darma, and Kankara, (2017) studied diminishing solar radiation as a driving factor of changes in space laboratory: a study of March 29th 2006 solar eclipse as viewed and monitored in Katsina State. The results found out that the solar eclipse provides a natural space laboratory for measurement of diffused radiation and its effects of ecosystems. The study further observed some scientific changes that affect the optimum condition of living species. Ladan (2017) studied the challenges facing the teaching of astronomy at Alqalam University Katsina. The results found out that the challenges include lack of basic instruments, facilities, inadequate teaching resources, large number of students and poor remuneration for part-time lecturers.

From the literature reviewed above, it can be observed that the study by Lugga (2014) focuses on the moon sighting controversy as experienced almost annually in Katsina State and indeed Northern Nigeria. The study by Ladan (2015) focused on the relevance of studying astronomy in Islamic Universities in

Nigeria with particular reference to Alqalam University Katsina. Darma and Kankara (2017) focused on the March 29th 2006 solar eclipse as viewed and monitored in Katsina State. The study by Ladan (2017) again focused on the challenges facing the teaching of Astronomy as a discipline at Alqalam University Katsina. It can be observed that none of the studies focuses on the occurrence of lunar eclipse in Katsina metropolitan with the view to measuring the knowledge and perception of the astronomical event.

This article examines knowledge and perception of astronomical events with particular reference to the Friday 27th July 2018 lunar eclipse, among students of Hassan Usman Katsina Polytechnic, Katsina Katsina State. The selection of a Polytechnic for the study is apt as the Polytechnics are science and technology based institutions that play a critical role in the technological advancement of the country.

METHODOLOGY

Data for the research were generated using structured questionnaire survey conducted on two sets of students studying National Diploma Science Laboratory Technology (ND SLT) and National Diploma Mass Communication (ND Mass Comm.). One hundred (100) questionnaires comprising fifty (50) questionnaires each were distributed to the two set of the students mentioned above during lecture period for the students to complete within the thirty minutes after which the questionnaires were retrieved and collected from them. This on the spot method of completing the questionnaires were deemed appropriate to prevent any external influence or contact with another person or using the cell phone to browse and find some of the answers to the questions on the questionnaire.

The questions contained on the questionnaire are on the demographic characteristic of the respondents and questions meant to measure the knowledge of the students on the lunar eclipse that occurred and witnessed by the students. There are also questions meant to measure the perception of the students on the lunar eclipse. The questions to measure knowledge of the astronomical event are accompanied with options a, b, c and d with the respondents expected to select the option they think is the correct answer to the question. The options serve as a guide to the respondents in choosing the correct answer considering the fact that there is averagely low level of astronomical knowledge in Nigeria as a whole. The questionnaires were administered on the 1st of August 2018 which was five days after the occurrence of the lunar eclipse which means that the memory of the event is still fresh with the respondents.

Secondary sources of data were collected through desk research from textbooks, international conference papers, publications of Astronomical Society of Nigeria, journal articles from peer reviewed journals, international magazines and internet sourced materials. The data collected were edited and analysed through descriptive analysis in terms of tabulations, percentages and averages.

RESULTS AND DISCUSSION

Demographic Characteristics of the Respondents

The demographic characteristics of the respondents can be seen on the table 1 below:

Table 1 : The demographic characteristics of the respondents.

S/NO.	Characteristic	Frequency	Percentage
1.	Gender		
	Males	55	55.00
	Females	45	45.00
2.	Age range		
	18-20 years	37	37.00
	21-23 years	53	53.00
	24-26 years	10	10.00
3.	Marital status		
	Single	92	92.00
	Married	08	08.00
4..	Number of members in family		
	1-5 members	32	32.00
	6-10 members	36	36.00
	11-15 members	32	32.00
5.	State of origin		
	Katsina State	65	65.00
	Kaduna State	10	10.00
	Kano State	05	05.00
	Other northern States	10	10.00
	Southern States	10	10.00
6.	Residency status		
	Student's hostels	55	55.00
	At home in the town	42	42.00
	Staff quarters	03	03.00
7.	Program of studies		
	National Diploma in Science Laboratory Technology (ND SLT)	50	50.00
	National Diploma in Mass Communication (ND Mass Comm)	50	50.00

Source : Data analysis (2024).

From table 1, it can be observed that majority of the respondents (55.00%) are males while the remaining 45.00% are females. This showed that though the males constituted majority of the respondents the females are also adequately represented in the study. The age range of the respondents showed that majority (53.00%) are within the age range of 21-23 years of age which is quite a youthful segment of the population up to the present time (2024). In terms of marital status majority are single (92.00%) with only a minority (08.00%) been married. Majority of the respondents (36.00%) are living in families where the members are between 6-10 in number. This relatively high number in the Nigerian situation means that there at least one family member will call the respondents telling them what to do during an astronomical event such as the lunar eclipse.

The State of origin of the respondents showed that majority (66.00%) are from Katsina State where the Polytechnic is located but other States of the federation are also represented. The other northern and southern States constituted 20.00% of the respondents and this showed that the response to the questionnaire has a national outlook. The residency status of the respondents showed that majority (55-

00%) resides at the student's hostel of the Polytechnic and thus were at the institution at the time of the lunar eclipse.

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The respondents who are students of the ND SLT and ND Mass Communication have shown varied knowledge and perceptions of the astronomical event of the lunar eclipse that occurred and was clearly visible in Katsina metropolitan on July 27th 2018. The varied responses are highlighted below and shown on table 2.

1. Date of occurrence of the lunar eclipse: On the research question of which date did the lunar eclipse occurred, seventy one per cent (71.00%) of the respondents indicated that it was July 27th 2018. This is correct and showed that they have knowledge of the exact date of the occurrence of the eclipse. According to the European Space Agency (ESA) the eclipse was the second to have occurred in the year 2018, the first for the year occurred on January 31st 2018. As mentioned earlier this is the third eclipse Nigerians are witnessing in the 21st century.

2. Type of lunar eclipse : On the research question of what type of lunar eclipse occurred of the particular date of July 27th 2018, twenty five per cent (25.00%) of the respondents indicated that the types is total lunar eclipse not partial or penumbral. This percentage of 25.00% is very low and shows limited knowledge on the types of lunar eclipses that occurred on the planet Earth. A total lunar eclipse is an eclipse where the shadow of the Earth that falls on the moon totally covered the moon producing darkness on the moon surface.

3. Position of the Earth during a lunar eclipse: On the research question of where is the position of the Earth during a lunar eclipse, ninety per cent (90.00%) of the respondents indicated that the Earth's position is between the sun and the moon. This correct response is the highest percentage indicating very good knowledge of the position of the Earth during lunar eclipse. According to NASM (2020) when the Sun, Earth and Moon are precisely aligned, a lunar eclipse will occur and during an eclipse the Earth blocks sunlight from reaching the moon.

4. News of the lunar eclipse: On the research question of how did the respondents hear the news that the lunar eclipse will be occurring, fifty one per cent (51.00%) of the respondents indicated that it was through the social media platforms such as Facebook and Whatsapp. The other respondents heard the news through the radio (16.00%), cell phone text message (12.00%) and television (10.00%). Only twelve per cent (12-00%) of the respondents did not hear any news that the lunar eclipse is occurring prior to the date.

5. Noticing the lunar eclipse: On the research question of how did the respondents noticed that there is an eclipse on the date, fifty five per cent (55.00%) of the respondents indicated that they looked at the sky to notice the eclipse. Viewing the eclipse with the naked eyes is a good way of noticing and knowing that the eclipse is occurring. According to the respondents not only them but also other students of the Polytechnic who reside at the student's hostel came out to notice the celestial event.

6. Viewing the lunar eclipse: On the research question of did the respondents go outdoors to view the lunar eclipse when it was happening, sixty nine per cent (69.00%) indicated that they did go outdoors to view the eclipse. This high percentage shows direct knowledge of the event by viewing it when it was happening. Also, fifty six per cent (56.00%) indicated that they know that the lunar eclipse is safe to view directly with the naked eyes, binoculars or telescope.

7. Timing of the lunar eclipse: On the research question of which continents of the world will not view the eclipse due to its timing on the date, thirty five per cent (35.00%) of the respondents indicated that it was North America. The other continents will view the eclipse during the one hour and 42.955 minutes it lasted depending on the location (TAD, 2018). The eclipse will not be visible to viewers in North America except via webcasts. This clearly means that they will not get an eye view of the event even if there is favourable weather condition at the time (Petro, 2018).

8. Special nature of the lunar eclipse: On the research question of why was the lunar eclipse considered as special, thirty two per cent (32.00%) of the respondents indicated that it was because it was the longest

lunar eclipse to occur in the 21st century. The lunar eclipse became the longest due to the length of time it took while it was happening which was 103 minutes in all. In fact according to European Space Agency (ESA) the time in which the Earth’s shadow completely engulfs the moon surface was for 103 minutes (ESA, 2018). This low percentage among the respondents clearly showed that the respondents who are students did not do some reading and research on the eclipse to find its special nature.

9.The lunar eclipse as blood moon : On the research question of why was the lunar eclipse that occurred on July 27th 2018 referred to as blood moon, fifty one per cent (51.00%) of the respondents indicated that it was because the moon became red in colour like blood. The moon appears to be reddish in colour because of Rayleigh scattering and the refraction of that light by the Earth’s atmosphere into its umbra (ESA, 2018 and TAD 2018).

10. Interesting phenomenon about the lunar eclipse: On the research question of if the respondents observe any interesting phenomenon on the lunar eclipse, fifty four per cent (54.00%) indicated that it was the change in colour of the moon to red. Others observed that many people came out to watch the astronomical events while few people were seen praying at a mosque in line with religious teachings.

11. Studying Geography at senior secondary school: On the research question of if the respondents have studied Geography while at senior secondary school, fifty two per cent (52.00%) of the respondents indicated yes. As students the main source of knowledge on Astronomy is from the study of Geography at senior secondary school. In Physical Geography, the first topic is “The Earth in Space “where the students will learn about the solar system and the universe. Eclipses of the moon (lunar) and sun (solar) are sub-topics that students learn about the occurrence of eclipses (Emielu, 2008).

12. Perceiving the lunar eclipse as a normal astronomical event: On the research question of whether the respondents perceive the lunar eclipse as a normal astronomical event, forty six per cent (46.00%) indicated yes. This means that majority of the respondents (54.00%) indicated that they did not perceive the lunar eclipse as a normal astronomical event. This was why fifty eight per cent (58.00%) receive phone calls telling them to pray for the passage of the eclipse by their close relations such as father, mother, brother and sister or telling them to stay indoors. This was particularly in reference to the respondents who stay at the hostels of the Polytechnic.

13. Holding any belief on the eclipse: On the research question of if the respondents are holding any belief on the occurrence of the lunar eclipse, forty five per cent (45.00%) of the respondents indicated yes. The belief included that the occurrence of the eclipse means that the moon is sick and need medication in form of prayers to recover from the sickness. Others hold the belief that viewing the lunar eclipse for a long time will cause headache to the person.

Table 2 : Knowledge of the Astronomical events among students of HUK Polytechnic, Katsina

S/NO.	Questions on the Astronomical event (Lunar eclipse)	Score
1.	On which date did the lunar eclipse occurred ?	71.00%
2.	What type of lunar eclipse occurred on the date ?	25.00%
3.	Where is the position of the Earth during a lunar eclipse ?	90.00%
4.	Where did you hear the news that the lunar eclipse will be occurring ?	51.00%
5.	How did you notice the lunar eclipse ?	55.00%
6.	Did you view the lunar eclipse outdoors when it is happening ?	69.00%
7.	Which continent will not view the lunar eclipse due to its timing ?	35.00%
8.	Why was the lunar eclipse considered as special ?	32.00%
9.	Why was the lunar eclipse referred to as blood moon ?	51.00%
10.	What is the interesting phenomenon about the lunar eclipse ?	54.00%
11.	Did you study Geography at senior secondary school ?	52.00%

Source: Data Analysis (2024).



Figure 1: The blood moon during the lunar eclipse visible in Katsina metropolitan

CONCLUSION

Astronomical events have been occurring on yearly basis and the country Nigeria has been witnessing them. There is the need to especially measure the knowledge of such events among students of tertiary institutions who are mostly among the youthful segment of the population whom the future of the nation depends on. This paper examines the knowledge and perception of astronomical events using the July 27th 2018 lunar eclipse as a case study among the students of Hassan Usman Katsina Polytechnic Katsina, Katsina State Nigeria. The overall results showed that the respondents on the average have a score of 53.18% on the knowledge of astronomical events which is can be graded as good. In terms of the perception, most of the perceptions of the respondents are typical of developing countries where there are limited investments in the science of astronomy.

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