

THE ROLE OF YOUTH IN DIGITALIZING FALAK SCIENCE IN ISLAMICASTRO APPLICATIONS

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Abstract

This research starts from academic awareness when realizing Falak keyword in the Play Store. It shows fifteen Falak applications by programmers without validated Falak competence. This is crucial, because Falak regulates not only astronomical or social relations, but also theological. One of these applications were developed by Falak youth, namely Muhammad Faishol Amin with his Islamicastro. This research discusses digitization of Falak by Islamicastro and youth Falak contributions. This research is qualitative type that based going exploring. Primary and secondary data collection is done by documentation and interviews. The research data is processed in three stages, codification, presentation, and conclusion drawing. Then data were analyzed with descriptive analysis and inductive thinking methods. The conclusion is Islamicastro helps Falak practitioners by his data accuracy in the field. From literatures, algorithm of Islamicastro uses the ephemeris method, the spherical astronomy, and the renewal of vincety method. Muhammad Faishol Amin are agents of change as UU No. 40 of 2009 whose part is anacted role, prescribed role, and role models.

***Keywords:**Falak, Youth, Digitization, Islamicastro, Role.*

Abstrak

Penelitian ini berangkat dari kegelisahan akademis saat melihat kata kunci Falak di aplikasi Play Store menyuguhkan setidaknya lima belas aplikasi. Namun dari keseluruhan aplikasi, banyak di antaranya dikembangkan oleh pengembang yang belum diketahui kompetensinya akan ilmu Falak. Hal ini menimbulkan kekhawatiran mengingat ilmu Falak tidak hanya mengatur urusan astronomis, sosial, namun juga urgensi teologis. Dari beberapa aplikasi tersebut, terdapat aplikasi yang dikembangkan oleh pemuda bernama Muhammad Faishol Amin dengan nama aplikasi Islamicastro. Tulisan ini kemudian membahas digitalisasi Ilmu

Falak berupa Islamicastro, hingga peran pemuda Falak dalam digitalisasi. Penelitian ini merupakan penelitian kualitatif berbasis going exploring. Pengumpulan data primer dan sekunder dilakukan dengan dokumentasi dan wawancara. Diolah melalui tiga tahapan yaitu kodifikasi, penyajian, dan penarikan kesimpulan. Kemudian analisa data menggunakan analisis dekriptif dengan metode berpikir induktif. Kesimpulannya adalah Islamicastro hadir untuk membantu praktisi Falak di lapangan dalam memberikan data secara praktis dan akurat. Dari ragam literatur yang dirangkum dalam rancang bangun aplikasinya, Islamicastro dalam algoritma perhitungan dan pemrogramannya memanfaatkan metode ephemeris, segitiga bola, dan pembaruan metode vincety. Muhammad Faishol Amin adalah pemuda dengan bagian perannya adalah anacted dan prescribed role, juga role model yang berperan sebagai agen perubahan dalam bidang ilmu pengetahuan dan teknologi berdasar pada UU No. 40 Tahun 2009.

Kata Kunci: Falak, Pemuda, Digitalisasi, Islamicastro, Peran.

A. Introduction

The digitization of Falak¹ Science is a breakthrough made by Falak practitioners, in responding to the needs of the times. Technological developments fundamentally affect various human activities. Falak Science is one of the objects of this technological development. This is intended to bring the Falak discourse to the community with easy access and understanding to many circles.

As a science, Falak has the impression of being a classical science because the understanding and discussion of it has been done a long time ago. Although it has the impression of being a classical science, Falak Science by Falak practitioners is harmoniously collaborated with various scientific advances. So that Falak is not only present in the domain of science and religion, but also in the domain of technology. And youth, are one of the parts that are expected to play a role in the development of Falak and technology.

The scientific discourse of Falak² generally focuses on four things, as a science that is closely related to the rituals of Muslim worship, namely, the direction of the

¹ Etymologically, falanges comes from the word الفلك which means orbit or trajectory of celestial bodies. So then, the Science of Falak is understood as a scientific study that discusses the trajectories of celestial bodies, in particular the earth, moon and sun, in their orbits with the intention of knowing their positions with each other so that the times on the earth's surface are known. Read Muhyiddin Khazin, *Ilmu Falak dalam Teori dan Praktik*, (Yogyakarta: Buana Pustaka), 1.

²Ahmad Izzuddin, *Ilmu Falak Praktis*, (Semarang: Pustaka Rizki Putra, 2012), 2, states that astronomy can be divided into two types, 1) Theoretical Astronomy as a science that discusses the theory and concepts of objects, 2) Practical Astronomy / Observational Astronomy as a science that performs calculations to find out the position and position of celestial bodies from one another.

Qibla, the time of prayer, the determination of the beginning of the Hijri month, and the calculation of lunar and solar eclipses. However, Falak science also discusses the calendar in the world and conversion between calendars, measurement of distances between celestial bodies and their structural origins, and so on. So that the urgency is not limited only to theological issues, but also urgency on social, cultural, economic, and political issues.

In the theological aspect, for example, one of Falak's scientific stages was determining the direction of the Qibla.³ Facing the direction of this Qibla becomes urgent because it is needed in prayer services and is a legal requirement,⁴ to bury the body. The legal basis for determining the direction of the Qibla as in al-Qur'an surah al-Baqarah: 149,

وَمِنْ حَيْثُ خَرَجْتَ فَوَلِّ وَجْهَكَ شَطْرَ الْمَسْجِدِ الْحَرَامِ ۚ

Meaning: And wherever you (Muhammad) come out, face your face towards the Grand Mosque⁵

Furthermore, on social issues, the Hijri calendar affects relationships between persons or even institutions. For example, in determining the beginning of the month of Ramadan with a variety of different systems of determination by religious community institutions in Indonesia, and so on. Whereas in the economic aspect, the calendar has a role for example in determining market strategy,⁶ good days in trade, and also in certain areas, Bali, for example, the calendar is the main instrument in determining pekenan in Bali.⁷

³ The Qibla direction is the closest direction to the Ka'bah through the great circle of the globe. The circle of the globe through which the Qibla direction passes can be called the Qibla circle. Meanwhile, the qibla circle can be defined as the circle of the globe through the axis or axis of the qibla. Read on Slamet Hambali, *Ilmu Falak Arah Kiblat Setiap Saat*, (Yogyakarta: Pustaka Ilmu Yogyakarta, 2013), 14.

⁴Muhammad Adieb, *Studi Komparasi Penentuan Arah Kiblat Istiwaaini Karya Slamet Hambali dengan Theodolite*, (Skripsi- IAIN Walisongo, Semarang, 2014), 4.

⁵Al-Qur'an, 2: 149.

⁶Rama Imandani, *Analisa Anomali Kalender terhadap Return di Bursa Efek Indonesia*, (Skripsi ~ UIN Syarif Hidayatullah, Jakarta, 2008), 32.

⁷Fajri Zulia Ramdhani, *Analisis Kalender Pawukon Bali*, (Skripsi ~ UIN Walisongo, Semarang, 2017), 3.

Youth, as defined by law, are Indonesian citizens who enter an important period of growth and development, aged 16 (sixteen) to 30 (thirty) years.⁸ The development of technology towards digitalization in the era of the industrial revolution 4.0 is a consideration in this hope. This industrial revolution 4.0 is a new industrial era marked by the digitization of various sectors of life. Changes in the dynamics of the rate of movement that were originally centralized to humans as subjects, have undergone a shift and have been replaced by mechanical automation and technological digitization.⁹

With the keyword Falak, in the author's search, through the play store application, there are at least 15 (fifteen) applications available.¹⁰ This application provides necessities in practical fields such as prayer times, Qibla direction, Hijri calendar, Javanese calendar, date conversion, as well as in theoretical fields such as the Phalanx book, astronomical data, and books.

Among the applications of Falak Science, several applications were developed by those whose scientific competences in the field of Falak were not yet validated and well-known. This is certainly a concern for the author, considering that the science of Falak does not only regulate scientific and social affairs, more than that it regulates the servitude / theological relationship between Muslims and their God.

One of the Phalangist Science applications was developed by a young man named Muhammad Faishol Amin, a Magister of Phalangist Science at UIN Walisongo. The Islamicastro application has six features in it, namely the direction of the Qibla, prayer times, location, ephemeris data, sun and moon positions, and assistance.

The active role of youth as agents of change as stated in the law, is realized by developing one of them, science and technology.¹¹ Youth should use phalanges as science and technology as development instruments. So that science in the practical

⁸Law of the Republic of Indonesia, Number 40 of 2009 concerning Youth.

⁹Hendra Suwardana, *Revolusi Industri 4.0 Berbasis Revolusi Mental*, *Jati Unik*, Volume 1, number 2, (2017), 103.

¹⁰Among the applications in question are Digital Falak, Falak ABI Prayer Times, Book of Falak Science, Islamicastro, Complete Phalangist Science, Mizwandroid - Qibla Direction Finder, Faza Haul, Prayer and Qibla Falak Science, Complete Rukyat Science, Prayer Times and Imsakiyah, Calendar Hijri - Islam, Prayer Times, Qibla and Adhan, Prayer Times and Adhan, Hijri Calendar for the Market, Usholli - Prayer Times for the Ministry of Religion of the Republic of Indonesia.

¹¹ See Law Number 40 of 2009.

realm can be used openly and efficiently. Moreover, Falak science is urgent because it is present in aspects of human life.

This paper will discuss the digitization of Falak science in the Islamicastro application, the profile of application developers, as well as the role of youth in the development of digitalization of Falak science. In particular, the purpose of this paper is to disseminate the Islamicastro application academically to the public so that the Islamicastro application can be enjoyed more widely.

The digitization of Falak is starting to be discussed in academic discussions. In particular, the Islamicastro application is discussed in several studies such as the thesis by Muhammad Jumal with the title "Accuracy of Islamicastro Application of Sun and Moon Position Data for Rukyatul Hilal" Thesis of UIN Walisongo in 2019, also by Nilna Minakhah with the title "Islamicastro Android Application Accuracy Study Version 1.8 .12 in Determining the Qibla Direction ". Both of them discuss one feature of the Islamicastro application, namely the Position of the Sun and Moon and the Direction of the Qibla. Then "Implementation of Istiwa'ani in Android-Based Application Programming" by Muhammad Faishol Amin who explained the istiwa'aniplah in the Qibla Direction feature of the application, Islamicastro, which was published on Techno.Com Volume 18 Number 1, February 2019.

All of this literature is certainly different from the discussion in this paper. Because this study discusses the entire Islamicastro application, as well as the role of the developer as a youth in digitizing Falak Science. So that this research is a novelty that has never been discussed before.

B. Method

The research was conducted with a qualitative type based on going exploring. Primary and secondary data collection was carried out by documentation and interviews. Processed through three stages, namely codification, presentation, and drawing conclusions. Then the data analysis used descriptive analysis with inductive thinking method.

C. Discuss And Result

C.1. Digitalization of Phalanges in Islamicastro Applications

Islamicastro is a Falak science application that can be accessed freely by android users on the play store. After opening the first display, the user will be presented with a display of six features, namely, Qibla Direction, Prayer Times, Location, Ephemeral Data, Sun and Moon Position, and Assistance.

Islamicastro comes from the developer's desire to learn java language, xml and eclipse software. This manifestation of learning resulted in an android application in 2016. When the initial year the developer entered the Postgraduate Program. This application is assisted by the Android Studio platform IDE application development software with the programming languages being java and xml. The source processing of the calculations came from Slamet Hambali, Muhyiddin Khazin's, and Ahmad Izzuddin, Falak literature.¹²

Each feature that is present in the Islamic astro application has its own background. He wants to present an application with consideration of effectiveness and efficiency by combining measurements and calculations without leaving the element of accuracy. In the Qibla direction application, for example, the inspiration came from the Hendro Setyanto application in his application, namely Mizwandroid.¹³

The main practical aspect is in calculating the reckoning in determining the beginning of the month of Qamariyah, the Falak experts in their books only show one reckoning result. Meanwhile, the practice of rukyah requires the latest time from the issuance of the new moon to the setting of the new moon. And the calculations of hisab so far have not accommodated the whole time. This led him to develop the features of the Sun and Moon and their location graphs. So that perukyat can find out at the current time the position of the sun and moon.¹⁴

¹² Interview with Muhammad Faishol Amin, Interview, Gresik. October 30, 2019

¹³ Amin, Interview.

¹⁴ Jumal, *Akurasi Data Posisi Matahari dan Bulan Aplikasi Islamicastro untuk Rukyatul Hilal*.

Meanwhile, the feature of prayer times is an application of Diana Manzil's Thesis entitled, "Fa Waktuūlah Time, Ikhtiyār, and Jawāz Prayer Five Times in Normal and Abnormal Areas: Study of the Kitab al-Majmū' The Works of Imam An-Nawawi".¹⁵

Making the Islamicastro application is carried out in stages. The time needed to become an application with all features is one year and six months. The Islamicastro application was in perfect shape in September 2017. However, the first time it was uploaded to the play store was on 23 August 2018. Then the first updating process was carried out on 13 October 2018, and the last on 10 January 2019.¹⁶

Islamicastro specifically summarizes the science of Falak discourse, namely, Qibla Direction,

a. Manual Qibla Direction

The Qibla direction feature is used by users who want to get the latest data information on its location in the Qibla direction. It is enough to activate the GPS on the android device, then press the Qibla direction feature. After waiting for a moment to load, the coordinate data will appear. The data will provide latitude and longitude information, accuracy, direction and azimuth of the Qibla.

b. Automatic Qibla Direction

This feature is an advanced feature of the Qibla direction. This is to make it easier for users to get the Qibla direction directly. In the Islamicastro application, there are two tools used in this automatic Qibla determination, namely Istiwa 'Mobile and the Qibla Compass.

The way to use Istiwa 'Mobile is by placing the mobile device on a flat surface, assisted by a waterpass on the screen on all four sides. Point the top of the device toward the sun and then straighten the object that is perpendicular to the ground. The direction shown in the arrow is the Qibla direction. Istiwa 'Mobile can also be used for the calculation applications of Theodolite, Total

¹⁵ Li'izza Diana Manzil, *Waktu Faḍīlah, Ikhtiyār, dan Jawāz Salat Lima Waktu dalam Daerah Normal dan Abnormal: Studi Kitab al-Majmū' Karya Imam An-Nawawi*, (Thesis - UIN Walisongo, Semarang, 2018).

¹⁶Amin, Interview.

Station, Mizwala, and Istiwa'aini. By pressing the camera button while shooting the tool, then the tool is directed according to the azimuth value on the display.¹⁷

Meanwhile, if you want to use the Qibla compass, first make sure your mobile device is supported by a compass. And then the qibla compass can be used.

c. prayer Times

Prayer times provide daily data to users when prayer times are entered. Interestingly, this feature not only provides the beginning of the time, but also fadhilah, ikhtiyar, jawaz, and makruh from the prayer times. Apart from the time of Fajr, Zuhr, Asr, Maghrib, Isha, there is also information on the time of the first 1/3 of the night, midnight, 1/3 of the second night, Imsak, Terbit, and Dhuha.

d. Ephemeris Manual

This feature is used to find data on the sun and moon at any time. What is done is by entering the desired date and time.

e. Real Time Digital Ephemeris

The real time digital ephemeris is the developer's answer to Falaki's difficulties in the field. Namely without interpolation, users can immediately search for the current time from the sun and moon data.

f. Location

This feature is an alternative to developers for handled Global Positioning Systems (GPS). By utilizing the GPS sensor on an Android device, users can be presented with data on latitude, longitude, altitude, speed and direction of motion, without the need to buy or use expensive handheld GPS.¹⁸

g. Position of the Sun and Moon

This feature is a feature that provides information about the position of the sun and moon in real time, even with a graph. Is a product of the Jean Meus

¹⁷Jumal, *Akurasi Data Posisi Matahari dan Bulan Aplikasi Islamicaastro untuk Rukyatul Hilal*, 42.

¹⁸Ibid., 43.

algorithm which has high accuracy. This position can be used in new moon observation equipment, even for verifiers in lunar and / or solar eclipses.

The literature used in Islamicastro also varies. Among the literatures used is Slamet Hambali's book Science of Phalanges of the Qibla Direction at any time.¹⁹ This book is the source of the qibla direction formulas used. Astronomical Alghorithms, by Jean Meus.²⁰ This source is used in the Ephemeris. In correcting Ephimeris, he used the book Mechanics of Heavenly Objects²¹ and the Microsoft Excel program from Rinto Anugraha. The Book Ilmu Falak I by Slamet Hambali.²² Li'izza Diana Manzil's thesis with the title "Waktu *Faḍīlah*, *Ikhtiyār*, dan *Jawāz* Salat Lima Waktu dalam Daerah Normal dan Abnormal: Studi Kitab *al-Majmū'*Karya Imam An-Nawawi"("Falahīlah Time, Ikhtiyār, and Jawāz Prayer Five Times in Normal and Abnormal Areas: Study of Kitab al-Majmū' The Works of Imam An-Nawawi")²³ was used for correction. Also the book Ilmu Falak dalam Teori dan Praktik by Muhyiddin Khazin.²⁴

Islamicastro is compiled from a variety of literature which is extracted from the same method, namely the Ephemeris method. Ephemeris is one of the contemporary methods of astronomical calculations. Apart from this method, the spherical triangle method is also used and the vincety method is updated mainly in the Qibla direction.²⁵

Islamicastro is a Falak science application that can be accessed freely by android users on the play store. After opening the application²⁶, the user will be presented with a display of six features on the main page, namely, Qibla Direction, Prayer Times, Location, Ephemeris Data, Sun and Moon Position, and Assistance. At

¹⁹Hambali, *Ilmu Falak Arah Kiblat Setiap Saat*.

²⁰ Jean Meus, *Mathematical Astronomy Morsels*, (Virginia: Wirman-Bell. Inc., 1997).

²¹Rinto Anugraha, *Mekanika Benda Langit*, 2012.

²²Slamet Hambali, *Ilmu Falak 1 Penentuan Awal Waktu Shalat dan Arah Kiblat Seluruh Dunia*,(Semarang: Program Pascasarjana IAIN Walisongo, 2002).

²³ Nawawi, Imam Abi Zakariya Muhyiddin bin Syarif, *Kitab al-Majmu' Syarh al-Muhażẓab li asy-Syirazi*, Juz 3, (Jeddah: Maktabah al-Irsyad).

²⁴Khazin, *Ilmu Falak dalam Teori dan Praktik*.

²⁵Amin, Interview.

²⁶ Open the Islamicastro application after downloading on the play store or via the link <https://play.google.com/store/apps/details? Id = com.gresikdev.islamicastro>.

the bottom of the main page is the application version, and at the top there is the current day, market, date and time. In the Qibla Direction feature, two advanced features are presented, namely Istiwa 'Mobile and Qibla Compass. At the top of the page, there is an inscription of the title "Qibla Direction with Sun Shadow and Compass Sensor". After the title, the description is 'Data Coordinates and Qibla Direction, wait for the smallest accuracy (± 5 meters). Select Istiwa 'Mobile or Qibla Compass' after which the data of latitude, longitude, accuracy, direction, and azimuth are presented according to the user's location.

Then if the user wants the direction to be facing, then they can choose Istiwa 'Mobile or the Qibla Compass. In the Istiwa 'Mobile display, besides the Qibla direction, you can know the position of the cellphone. Then, underneath there are various information such as the current date and time, sun azimuth, qibla azimuth, different azimuth, and information that the position of the Qibla from the sun, also the time of the race} d al-qibla. The Qibla Compass provides a display of a compass image with each position cardinal directions with initials. U for North, T for East, S for South, and B for West. And the Qibla position is marked with the Ka'bah symbol with the compass above the Qibla angle data. After the Qibla direction, the second feature is the prayer times. In the page "Prayer Times", data with the title "Prayer Times Data" is available including latitude, longitude, height, and accuracy. Once above it is the same information on the Qibla direction page. Then at the bottom there is a calculation column, this column can be pressed after the prayer time data is complete.

After the title "Prayer Times", specify the districts, regencies, provinces and countries where the accessers are located. Not to forget, the latest date and time. The prayer time data available are daily data at the time of Zuhur, Asr, Maghrib, Isha prayer, first third, middle and second third night time, Imsak time, Fajr, sunrise time, and Duha. The location feature provides information on the user's current location. In the form of latitude, longitude, height, accuracy, movement, and also the direction of motion. At the top, information is provided up to the name of the street, number, sub-district, sub-district, district, province, country and zip code.

To access Ephemeris data, there are three types of access options, namely realtime, manual, and PDF export. Realtime Ephemeris provides Ephemeris data from application access times. The information section displays the day, market, date and time. Then the sun and moon data is displayed. With a description at the top and data at the bottom. Solar data includes Ecliptic Longitude, Ecliptic Latitude, Apparent Right Ascension, Apparent Declination, TG Distance, Semi Diameter, True Obliquity, Equation of Time. Meanwhile, the moon data states Apparent Longitude, Apparent Latitude, Apparent Right Ascension, Apparent Declination, Horizontal Parallax, Semi Diameter, Angle Bright Limb, Fraction Illumination. In the Ephemeris Manual, there are options to determine the desired date and time to be calculated. After the calculation process, the Ephemeris data will be displayed as on the realtime page with the time data desired by the user. The pdf export page only asks the user to specify the desired date and time as manually. However, then the data will be automatically saved on the cellphone memory as written in the lower part that appears shortly after pressing the calculate button.

The next feature is the position of the sun and moon. The solar position data above includes the Sun's Geo Height, Sun's Topo Height, Sun Azimuth, and Ufuk Position. Meanwhile, the data for the position of the moon are the height of the Moon Geo, the height of the Moon Topo, the Azimuth of the Moon, the elongation, the phase, and the position of the Ufuk. The Help feature has two menus, namely the about menu and the how to use menu. In the about menu, you will detail the application, version, to the developer's access contact, namely Muhammad Faishol Amin. When the user accesses the how to use menu, the following appears. Its many features make Islamicastro explain in detail how to use it.

C.2. Islamicastro Application Developer: Muhammad Faishol Amin's Profile

Muhammad Faishol Amin was born in Bungah Village, Gresik on January 23, 1994 to coincide with Sunday Pahing, 11 Sya'ban 1414 H. This man who is familiarly called Ishom lives in Sampurnan Hamlet RT 12 / RW 14 Bungah Village, Gresik District, Gresik Regency, Province East Java. Ishom was born to H. Ihsan Abdul Halim and Hj. Mufliah Zubair who is the fifth child of six children.

Through the maternal route, he is one of the seventh descendants of the Qomaruddin Islamic Boarding School in Bungah, Gresik. This cottage is one of the oldest huts in Gresik. His father is one of the teaching boards at the Qomaruddin Islamic Boarding School Foundation who is an expert in Faroid / Inheritance and Mathematics. Meanwhile, his mother is an expert in the knowledge of the Qur'an who is also a trainer of recitation of the Qur'an.²⁷

Ishom is the grandson of a Falak expert and caretaker of the Qomaruddin Islamic Boarding School named KH. Moh. Zubair Abdul Karim. His book work is *Ittifa' qDza' t al-Bainy fi Ma'rifati al-Hisab wa al-Khusufain*. This book refers to the book *Fath al-Ra'ufu al-Mannan* by KH. Abdul Jalil from Kudus and *Badi'atu al-Mitsal* by KH. Muh. Maksum from Jombang.²⁸

However, his interest in Falak started in Aliyah and increased when he entered the Phalangist Science department at IAIN Walisongo in 2012. Through the Scholarship Program for Santri Achievement (PBSB) from the Indonesian Ministry of Religion. Only his brother, Ahmad Fuad, has the knowledge of his grandfather. So he also learned from his brother about classical Falak science.

Ishom through his education from elementary to upper level at the Qomaruddin Islamic Boarding School Foundation. MI Ma'arif NU Sa'adah in 2000-2006, then MTs Ma'arif NU Sa'adah in 2006-2009, and MA Ma'arif NU Sa'adah in 2009-2012. Then he entered IAIN Walisongo in the Faculty of Sharia and Law, Department of Phallic Science from 2012 to 2016. After graduating, he continued his studies at the Postgraduate Program in Phalanges Studies Program from 2016-2018. Apart from formal education he also carries out formal education. Since Madrasah Diniyah Awaliyah, Wustho, to Aliyah at the Qomaruddin Islamic Boarding School. Then along with his undergraduate study he continued his non-formal education at Pondok Darun Najah, Semarang under the care of K. Sirodj Chudhori and K. Ahmad

²⁷Jumal, *Akurasi Data Posisi Matahari dan Bulan Aplikasi Islamicaastro untuk Rukyatul Hilal*, 32. Read Minakhah, *Studi Akurasi Aplikasi Android Islamicaastro Versi 1.8.12 dalam Penentuan Arah Kiblat*, 35.

²⁸Ibid.

Izzuddin. Then when he went to S2 he was at Pondok Ma'rufiyah under KH. Abbas Masrukhin.²⁹

Since MTs Ishom has been actively involved and participated in the organization. Among them are the Head of the OSIS (Intra School Student Organization) at MTs and MA Ma'arif NU Assa'adah in 2007-2008 and 2010-2011. In S1 he sat on the Daily CSSMoRA (Community of Santri Scholars of Ministry of Religious Affairs) UIN Walisongo in 2013-2014. After that he became Minister of the Department of Communication and Information CSSMoRA UIN Walisongo in 2014-2015. In addition, he is also Chief Editor of 2014-2015 Zenith Magazine, Team of Hisab Rukyah CSSMoRA UIN Walisongo 2015-2016, Member of Farabi Institute 2014-2016, Team of Hisab Rukyah Postgraduate UIN Walisongo 2015-2018, Qomaruddin Alumni Big Family Association Manager, Gresik 2017-present. , Management of Lajnah Falakiyah Nahdlatul Ulama Gresik 2016-present.³⁰

His other activity is at Gresik Astronomi Club. His enthusiasm grew Falak Science in his birthplace. Bringing him the spirit to collaborate. Moreover, he is the youngest Falak cadre in Lajnah Falakiyah Nahdlatul Ulama Gresik. With a desire to find a young Falak cadre, he came to the Gresik Astronomi Club.³¹

In addition to his organizational activities, he is now a Lecturer at the Qomaruddin Islamic Institute (IAI), Gresik since 2016 and also a Lecturer at the Qomaruddin College of Teacher Training and Education (STKIP), which has now become Qomaruddin University.³² At Qomaruddin University, he became a Lecturer in the Mathematics Education department and a lecturer in the Falak course. One of the features of the Mathematics education department at this University. While at IAI Qomaruddin he teaches in the Ahwal Al-Syakhsiyah department. Apart from being a lecturer, he is also a teacher at the Qomaruddin Islamic Boarding School. Even though they do not teach Falak lessons, not a few santri then personally learn about Falak from him outside of their cottage education hours.³³

²⁹Jumal, *Akurasi Data Posisi Matahari dan Bulan Aplikasi Islamicastro untuk Rukyatul Hilal*, 34.

³⁰Ibid.

³¹Amin, Interview.

³²Jumal, *Akurasi Data Posisi Matahari dan Bulan Aplikasi Islamicastro untuk Rukyatul Hilal*, 35-36.

³³Amin, Interview.

C.3. The Role of Youth in the Development of Falak Scientific Digitalization

Youth as referred to in Law No. 40 of 2009³⁴ contains the definition, namely Indonesian citizens in an important period of growth and development with an age range of 16 to 30 years. Muhammad Faishol Amin was born on January 23, 1994, which means he is currently 26 years old. And if it is calculated when designing the application, then if the Islamicaastro application is completed in September 2017, Faishol Amin is 23 years old. This means that explicitly, both when designing applications, and when they are now the object of research they are youths as referred to in Law no. 40 of 2009.

Benjamin White and Suzanne Naafs³⁵ summarize the study of youth and analyze that the definition of youth is not only limited to a person with a certain age range, but the scope is a life transition even seen as a big change. They criticized youth studies only looking at youth in a conventional way. The point is that youth is seen only as a period of transition from childhood to adulthood, from learning to work. According to him, youths do not see themselves in this way as studies show. Youth tend to develop their identity, forge independence, and then become key actors in their roles in society.

Referring to the criticism above, youths other than the intended age limit are those who then develop themselves to show their competence in self-search and development. And the process carried out by Muhammad Faishol Amin is quite representative of this. They show themselves and abilities based on science in the field of Falak and competence in producing appropriate technology in their fields.

The meaning of the word role is interpreted in several ways. First, with the historical concept using the concept of theater or drama in ancient Greece and Rome, the role is understood as a characterization carried by an actor in a drama performance. Second, with an explanation that points to social connotations, role is a function that is carried out by a person based on his position in the social structure. Third, with an understanding that is operational, meaning that one's role is a

³⁴ Law Number 40 of 2009.

³⁵ Benjamin White, Suzanne Naafs, *Generasi Antara: Refleksi Tentang Studi Pemuda Indonesia*, *Jurnal Studi Pemuda*, 1 (2), 89-106, 2012.

boundary designed by another, meaning that it is positional which includes two complementary role actors.³⁶

In understanding role theory, structuralists and interactionists are used. Structuralist understanding makes roles as cultural units that are normatively governed by cultural systems, such as rights and obligations. This means that there is a permanent and patent relationship with each other. If the former is passive-static, then interactionist understanding is more active-dynamic. This is because the role is manifested as an element of the social system and internalized by individuals according to their perspective.³⁷

Roles with specific behavioral characteristics of one behavior or a context, depending on four things, roles are behavioral, roles performed by people, roles are limited to some things by contextual specifications and do not represent the whole behavior, roles are manifestations of behavior that are characteristic a set of people and circumstances.³⁸ The role has several parts, namely³⁹:

- a. The real role (anacted role) is a way that someone actually does in carrying out a role.
- b. The prescribed role is the method that is expected by the community to carry out a certain role.
- c. Role conflict is a condition experienced by a person who occupies more than one status which demands conflicting expectations and goals.
- d. The role gap (role distance) is the implementation of the role emotionally.
- e. Role failure is a person's failure to carry out a certain role.
- f. A role model is someone whose behavior is imitated.
- g. The scope of roles (role set) is a person's relationship with other individuals while carrying out his role.

³⁶Edy Suhardono, *Teori Peran: Konsep, Derivasi dan Implikasinya*, (Jakarta: PT Gramedia Pustaka Utama, 1994), 3.

³⁷Ibid. 4.

³⁸Bruce J. Biddle, *Role Theory Expectations, Identities, and Behaviors*, (New York: Academic Press, 1956), 58.

³⁹Bruce J. Cohen, *Sosiologi: Suatu Pengantar*, (Jakarta: Rineka Cipta, 1992), 25.

h. Role strain is a condition that arises when a person has difficulty fulfilling the expectations or objectives of the role that is carried out due to conflicting inconsistencies.

To produce oneself as expected, it requires a proper assessment of oneself. The Yaacov Trope reveals that people tend to take the most informative steps about one's abilities. This step is called diagnostics. Trope emphasized that a good self-understanding is an important determinant in determining steps, especially if it is not known exactly where the abilities and potentials are. In addition, a consistent self-assessment is needed. As stated by Swann, the self needs to be sure to have a stable intrinsic quality. This is done by interpreting the behavior according to the self-concept of a particular situation. This process is called self verification.⁴⁰

UU no. 40 of 2009 formulates the roles, responsibilities, and rights of youth which are written in Chapter V: Roles, Responsibilities and Rights of Youth which contains articles 16-21. Articles regarding roles, namely in articles 16 and 17, are written⁴¹

Article 16

Youth plays an active role as a moral force, social control, and agents of change in all aspects of national development.

Article 17

1) The active role of youth as a moral force is manifested by:

- a. fostering ethical and moral aspects in acting in every dimension of youth life;
- b. strengthen faith and piety as well as mental-spiritual endurance
- c. raise legal awareness.

(2) The active role of youth as social control is manifested by:

- a. strengthen national insight;
- b. raise awareness of the responsibilities, rights and obligations as citizens
- c. generate critical attitudes towards the environment and law enforcement;

⁴⁰Shelley E. Taylor, dkk., *Psikologi Sosial: Edisi Kedua Belas*, (Jakarta: Kencana, 2012), 139.

⁴¹

- d. increasing participation in the formulation of public policies, ensuring transparency and public accountability; and / or
 - e. provide easy access to information.
- (3) The active role of youth as agents of change is manifested by developing:
- a. political education and democratization;
 - b. economic resources;
 - c. concern for the community;
 - d. science and technology;
 - e. sports, arts and culture;
 - f. concern for the environment;
 - g. entrepreneurship education; and / or
 - h. youth leadership and pioneering.

The constitution above contains how it is imperative for the youth as himself and citizens to take part. Based on this, then we return to examine how the role actually is in theory.

In terminology, the role is interpreted in three ways, namely the historical concept, position in the social structure, and operational understanding. Youth then if it is understood from the three ways of meaning above, the role of youth means, in the historical concept youth is likened to one of the plays in a theater performance or event which means life. This means that whoever is in the category that fits the definition of youth, then he is characterized as a youth with the steps and categories of his role as regulated by law.

The meaning of the role of youth when viewed from the position in the social structure, as explained by Edy Suhardono⁴², that carrying out the role means that he occupies a certain social position in society, so that he is subject to the prevailing and enforced social norms, social demands and rules. So that youth as individuals in this category also have a role in the social structure of the community that surrounds them.

In terms of operational understanding, youth in their position have boundaries that have been designed by both others and society, because of social involvement, and then they have complementary or complementary roles. Youth exist because there are

⁴²Suhardono, *Teori Peran: Konsep, Derivasi dan Implikasinya*, 6.

adults or children. And his role as youth cannot be separated from the existence of these two social groups, and so on.

Understand role theory using structuralist and interactionist ideas.⁴³ Muhammad Faishol Amin has completed his master's study in the field of Falak Science, after previously he was a bachelor of Falak Science. Among his obligations as a master and considered an expert, he then taught in related fields, practiced his knowledge in a practical scope in the organizational area, and made applications in order to spread his knowledge widely. This is the role he plays as a person who has competence in a certain field. Faishol Amin realized his ability to help provide solutions to various problems in the realm of the universe that he had previously encountered, which he developed in the application idea. It is not enough for students to graduate from Falak, he also develops it for the benefit and benefit of the wider community.

The problems he encountered when practicing ru'yat al-hilal, then led him to provide solutions in the form of sun and moon features to ephemeris data. Others, he also develops his knowledge, with creative processing to create a mobile feature> '. Until the association has made Islamicastro present in our midst. Others not only produce works, they also do consistency of competence by making themselves part of the Lajnah Falakiyah Nahdlatul Ulama Gresik, and others.

Among the parts of the role formulated by Bruce j. Cohen,⁴⁴ what the author can catch from Faishol Amin are three roles, namely enacted role, prescribed roles, and role models. Using one of the basic reasoning revealed by Biddle and Thomas⁴⁵, namely the phenomenal referant. Falak experts in general will wrestle in various fields of memorization based on their expertise. In the field of education, Falak experts will teach at Islamic boarding schools or at universities as a science. In the organizational field, there are two generalities, taking part in the memorization organization in community organizations at various levels, or participating in the team of Badan Hisab Rukyat (rukayat reckoning institution) of the Ministry of Religion of the Republic of Indonesia, both at regional to national levels.

⁴³Ibid.

⁴⁴Cohen, *Sosiologi: Suatu Pengantar*, 25.

⁴⁵Suhardono, *Teori Peran: Konsep, Derivasi dan Implikasinya*, 8.

If he is involved in literacy, then he will make Falak books, Falak books, and Falak science journals. In the instrument, it will make or reconstruct the tools of the universe into innovation, present, or make use of them in modern times. In the field of technology, there are those who make applications with various bases such as calculators, Microsoft Excel, to Android. Like figures of Falak Science such as Slamet Hambali, Mutohar Arkanuddin, Ali Mustofa, Hendro Setyanto, Thomas Djamaluddin, Ahmad Izzuddin, Arwin Junaidi Butar Butar, Susiknan Azhari, and so on.

Muhammad Faishol Amin proved himself in at least three of these areas, in the fields of education, organization and technology. The acting role referred to in this field for him is as stipulated in Law no. 40 of 2019 above, his role as youth includes being an agent of change in the fields of science and technology. He actually did his role in society by making himself a young man with qualified competence and was able to be involved and prove himself in at least three fields of Falak.

Then the prescribed role of a Falak magister certainly has a big contribution to Falak science, makes reforms, and adds color to the universe in millennial creativity. And then Faishol Amin proved it. He made the Islamicastro application. Even though he cannot be categorized as a figure, Faishol Amin has inspired his friends and many students as well as young Falak scholars to be able to make reforms and contribute in the field of Falak science. He became a figure who was invited to be discussed by friends to his younger siblings in the science of Falak. He certainly has entered the role of a role model according to the author.

Referring to the Falak figures mentioned above, the contribution made by Muhammad Faishol Amin was that he played an important role in the structure of the social order, primarily taken into account by academics of Falak science. They can do a good job, carry it beyond expectations, and even become an example of many other young Falak academics.

The digitization of Falak has certainly had several impacts on the development of Falak. The following is the opinion of Slamet Hambali⁴⁶ who is one of the Falak experts

⁴⁶ Slamet Hambali Bajangan Village, Semarang Regency, Central Java on August 5, 1954. He has been familiar with the science of Falak since childhood from his father, KH. Hambali. After finishing elementary school, he was sent to the Salafiyah Islamic boarding school, Pulutan, Salatiga. He was a student from KH.

in Semarang regarding the Islamicastro application. According to him, the Islamicastro application has a practical side of use as an answer to the implementation of Falak in life. The Islamicastro application has been downloaded 1000 times and has a rating of 4.9 stars. Besides praising the digitalization and creativity steps taken by Faishol Amin, especially in the Qibla Direction application which he designed in such a way, he provided input on how the prayer time feature is expected to add notifications such as Azan, and so on. He also praised the real time features of the sun and moon as well as its graphics. However, this feature only provides the latest time, but it doesn't facilitate if the user wants a certain time to know the position of the sun and moon.⁴⁷

Another opinion by the expert is from Siti Tatmainul Qulub⁴⁸, saying that the presence of the Islamicastro application is good, especially for the community and Falak academics. In addition to adding to the scientific repertoire in the field of astronomy and Falak science applications, these two applications are very much needed by the public. People can find out the Qibla direction, prayer times, location coordinates, sun and moon position data, and ephemeris data in one application, namely Islamicastro.

Others when asked about the advantages of the Islamicastro application and what are the shortcomings that he thinks there are in the application, he answered that Islamicastro is complete in terms of the object of the study of Falak science. This

Zubair Umar al-Jaelany, author of the book *al-Khulasah al-wafiyah*. He studied his undergraduate education at IAIN Walisongo 1979, and master's degree at the same campus in 2010. He became a lecturer at UIN Walisongo, Sultan Agung Islamic University, and STIE (School of Economics) Dharma Putra, Semarang. Due to his expertise in the field of Falak science, he has served as chairman of the Central Java PWNU Lajnah Falakiah (Regional Management of Nahdlatul 'Ulama), Head of the PBNU Lajnah Falakiah Research and Development Bureau (Nahdlatul' Ulama Executive Board), Deputy Chairman of the Central Java Rukyat Hisab Team, to members of the Working Conference and the Ministry of Religion RI'sab Rukyat Agency. Read in Hambali, *Arah Kiblat Setip Saat*, 82.

⁴⁷ Interview with Slamet Hambali, Interview, Semarang. November 11, 2019.

⁴⁸ Falak Lecturer at the Sunan Ampel State Islamic University in Surabaya. Born in Jember, December 29, 1989. Lives and has his address at Jl. Raya Sukolegok RT 14 RW 05, Sukodono, Sidoarjo. He studied S1 and S2 at IAIN Walisongo, Semarang. Where previously he attended SDN Jenggawah 03 Jember, then continued at MTs Miftahul Ulum Pondoklabu Ajung, Jember, and MA Darus Sholah, Jember. He was one of the recipients of the Santri Achievement Scholarship Program in 2007 majoring in Akhwal al-Sakhshiyah Concentration of Falak Science, IAIN Walisongo. His work in the field of Falak includes *Phantom Science from History to Theory and Application*, *Critical Analysis of the Decision of the Session of the Initial Determination of the Qamariyah Month in Indonesia in the Perspective of Ushul Fikih* published in *Al-Ahkam*, 2015, *Others are examining the concept of an international Islamic calendar, the idea of Mohammad Ilyas*. published in *Al-Marshad*, 2017, as well as the *Concept of the Closest Distance in Facing the Qibla*, in *Al-Qanun: Journal of Islamic Legal Thought and Renewal*. Other works can be seen through his [profile page on google scholar](#) interview with Siti Tatmainul Qulub, Interview, Surabaya. January 15, 2020.

application can display the determination of the Qibla direction either with istiwa '(sun's position and shadow) or with a compass, prayer times with various times plus 1/3 of the night, location coordinate data, ephemeris data, and sun and moon position data. This advantage is not found in other applications. In other words, this one application combines many applications. In addition, in terms of accuracy, this application is classified as accurate, so that it can be used as a guide by the community to determine the direction of the Qibla and know the time of prayer.⁴⁹

This application made by youth alumni of UIN Walisongo has had a lot of impact on the general public and academics. The general public has started to use this application a lot for their daily activities. The Islamicastro application is also used because of its accuracy and practicality. Not only in terms of application, but the enthusiasm of young programmers in making Phalanges and astronomy programs has also spread to other younger generations. Many Falak activists became enthusiastic about making a program like it or simply analyzing the program. This is evident from several studies in the form of a thesis that discusses Islamicastro applications and makes similar applications.⁵⁰

D. Conclusion

This paper concludes that Islamicastro is here to assist Falak practitioners in the field in providing practical data from mobile devices. The calculation and programming algorithm in Islamicastro is compiled from a variety of literature which is extracted from the same method, namely the Ephemeris method. Apart from this method, the spherical triangle method and the vincety method were also used. The role of youth in the role study carried out by Muhammad Faishol Amin is enacted role, prescribed role, and role model. Then from the three roles mentioned, he proved himself to be in at least three fields of Falak science, in the fields of education, organization and technology.

⁴⁹Ibid.

⁵⁰Ibid.

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