

NUMERICAL WISDOM: APPLYING THE FIBONACCI SEQUENCE TO PATIENCE AND SINCERITY IN SUFI ETHICS

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Abstract: This study tests the Fibonacci sequence as a pedagogical metaphor for the cumulative development of patience (sabr) and sincerity (ikhlas) in Sufi ethics. A sequential explanatory mixed-methods design involved 50 active Jamaah Tabligh members in Wonosobo, Indonesia. Quantitative data were collected through the Fibonacci-based Spiritual Development Scale (FSDS) and supplementary patience and sincerity measures; qualitative data came from interviews, participant observation, and limited digital ethnography. Eight Fibonacci terms were mapped onto tawbah, wara', zuhd, sabr, tawakkal, ridha, ikhlas, and ma'rifah. Mean scores declined from tawbah ($M = 4.12$) to ma'rifah ($M = 2.23$), indicating increasing difficulty at advanced stations. Wara' and zuhd explained 68% of the variance in sabr, while tawakkal and ridha explained 74% of the variance in ikhlas. Longer membership was associated with higher FSDS scores. Qualitative findings confirmed cumulative formation, accelerated transformation among experienced practitioners, and holistic interdependence among stations. The model is not proposed as a literal law of spirituality, but as a structured visual framework for Islamic ethics education, reflective practice, and digitally supported learning.

Keywords: fibonacci sequence; sufi ethics; patience; sincerity; spiritual development

Abstrak: Penelitian ini menguji deret Fibonacci sebagai metafora pedagogis bagi perkembangan kumulatif kesabaran (sabr) dan keikhlasan (ikhlas) dalam etika tasawuf. Desain mixed-methods sequential explanatory melibatkan 50 anggota aktif Jamaah Tabligh di Wonosobo. Data kuantitatif dikumpulkan melalui Fibonacci-based Spiritual Development Scale (FSDS) serta ukuran kesabaran dan keikhlasan; data kualitatif berasal dari wawancara, observasi partisipan, dan etnografi digital terbatas. Delapan bilangan Fibonacci dipetakan pada tawbah, wara', zuhd, sabr, tawakkal, ridha, ikhlas, dan ma'rifah. Skor rata-rata menurun dari tawbah ($M = 4,12$) hingga ma'rifah ($M = 2,23$), yang menunjukkan meningkatnya kesulitan pada maqam lanjut. Wara' dan zuhd menjelaskan 68% varians sabr, sedangkan tawakkal dan ridha menjelaskan 74% varians ikhlas.

Durasi keanggotaan yang lebih panjang berkaitan dengan skor FSDS yang lebih tinggi. Temuan kualitatif menegaskan pembentukan kumulatif, percepatan transformasi pada praktisi berpengalaman, dan keterkaitan holistik antar-maqam. Model ini bukan hukum literal spiritualitas, melainkan kerangka visual terstruktur untuk pendidikan etika Islam, praktik reflektif, dan pembelajaran berbantuan teknologi digital.

Kata kunci: deret fibonacci; etika tasawuf; kesabaran; keikhlasan; perkembangan spiritual

INTRODUCTION

The relationship between mathematical order and spiritual meaning has long attracted attention because both fields seek patterns that make complex experience intelligible. In Islamic intellectual traditions, numerical proportion has been discussed not merely as ornament but as a way of reflecting on harmony, balance, and signs of creation. Contemporary studies of mosque facades show that the Golden Ratio can be used to evaluate visual proportion in Islamic architecture, while broader discussions of revealed and natural signs encourage dialogue between religious interpretation and empirical observation¹. Research on the Golden Ratio also demonstrates how digital visualization can make abstract mathematical relationships easier to investigate and communicate². These developments provide an appropriate starting point for asking whether a mathematical pattern may also help learners conceptualize ethical and spiritual development.

The Fibonacci sequence, 1, 1, 2, 3, 5, 8, 13, 21, and so forth, is defined by the recurrence relation $F(n) = F(n - 1) + F(n - 2)$. Its educational value lies less in numerical novelty than in its cumulative structure: each new term incorporates the two preceding terms. The ratio between consecutive terms gradually approaches the Golden Ratio, creating a pattern that combines continuity, accumulation, and acceleration. Studies of golden symmetry and fractal visualization show that these properties can describe organized growth and help people interpret complex forms through accessible visual models³.

¹ Saya Jamal Rashid et al., "Using the Golden Ratio in Detecting the Aesthetics of Mosque Facades: The Case of Contemporary Mosques in Erbil City," *Al-Qadisiyah Journal for Engineering Sciences* 17, no. 1 (2024): 22–28, <https://doi.org/10.30772/qjes.2023.141688.1007>; Alamsyah et al., "Integrasi Ayat Kauniyah Dan Kauniyah Dalam Keilmuan Islam: Pendekatan Holistik Dan Komprehensif," *Jurnal Keilmuan Dan Keislaman* 3, no. 4 (2024): 3573–84, <https://doi.org/10.23917/jkk.v3i4.350>.

² S. Abramovich and V. Freiman, "Exploring the Golden Ratio with Technology: Connecting Mathematics to Art, Nature, and Beyond," *International Journal of Mathematical Education in Science and Technology* 53, no. 8 (2022): 2145–63, <https://doi.org/10.1080/0020739X.2021.1902008>.

³ I. V. Malov et al., "Golden Symmetry in Physiological Functions and Its Significance," *Biophysics* 65, no. 3 (2020): 478–92, <https://doi.org/10.1134/S0006350920030148>; A. Sharma et al., "Fibonacci

The present study uses this structure as an analogy for spiritual formation, in which advanced virtues are not isolated achievements but are supported by earlier disciplines and dispositions.

This analogy is relevant to Sufi ethics because classical and contemporary accounts of *maqamat* describe the spiritual path as ordered, cumulative, and demanding. Ethical progress involves repentance, vigilance, detachment, perseverance, trust, contentment, sincerity, and spiritual knowledge. Al-Ghazali's ethics emphasizes the disciplined formation of character rather than a single act of moral choice, and contemporary studies likewise describe purification of the self as a progressive educational process ⁴. Discussions of *maqamat* also show that the stations are relational: a later station depends on the stabilization of earlier practices and attitudes ⁵. Such descriptions resemble the cumulative logic of Fibonacci progression, but the resemblance has rarely been developed into an empirically examined pedagogical framework.

The specific focus of this study is *sabr* and *ikhlas*. Patience is not passive resignation; it involves sustained obedience, restraint in the face of wrongdoing, and resilience under adversity. Sincerity concerns the purification of intention from self-display, the desire for recognition, and self-admiration. Psychological and educational research indicates that patience can be operationalized as a learnable and measurable disposition, while Islamic ethical research emphasizes that sincerity requires continuous regulation of intention ⁶. These two virtues therefore offer a suitable test of the proposed model: *sabr* occupies an

Sequences in Fractal Visualization: Mathematical Foundations and Applications,” *Fractals* 33, no. 1 (2025): 2550001, <https://doi.org/10.1142/S0218348X25500011>.

⁴ A. A. Guseynov, “Al-Ghazali’s Golden Rule in Ethics: Universality and Particularity,” *Philosophy East and West* 70, no. 4 (2020): 1089–109, <https://doi.org/10.1353/pew.2020.0078>; A. Gül, “Education of Nafs in Sufism: Concepts, Methods, and Contemporary Applications,” *Journal of Sufi Studies* 10, no. 2 (2021): 178–201, <https://doi.org/10.1163/22105956-20211008>; M. Mulyadi et al., “Developing Islamic Character through Tazkiyah Al-Nafs: A Quasi-Experimental Study in Indonesian Islamic Schools,” *Journal of Beliefs & Values* 46, no. 1 (2025): 89–108, <https://doi.org/10.1080/13617672.2024.2301234>.

⁵ M. Y. Nawir and I. Santalia, “Tasawuf Maqamat Dan Ahwal Serta Perkembangannya Dalam Dunia Islam,” *Madani: Jurnal Ilmiah Multidisiplin* 2, no. 3 (2024): 407–14, <https://doi.org/10.5281/zenodo.12666257>; Rian et al., “Tasawuf, Maqomat Wa Ahwal Serta Perkembangannya Dalam Dunia Islam,” *Madani: Jurnal Ilmiah Multidisiplin* 3, no. 5 (2025): 540–45, <https://doi.org/10.5281/zenodo.16075547>.

⁶ A. E. Bülbül, “Effects of the Patience Training Program on Patience and Well-Being Levels of University Students,” *Journal of Education and Training Studies* 6, no. 1 (2018): 159–68, <https://doi.org/10.11114/jets.v6i1.2900>; A. Eryilmaz and H. A. Basal, “Development and Validation of the Student Online Learning Patience Scale,” *Educational Technology Research and Development* 72, no. 2 (2024): 567–89, <https://doi.org/10.1007/s11423-023-10289-x>; Z. Afna, “Riya Dalam Perspektif Imam Al-Ghazali: Studi Deskriptif Analitik Terhadap Kitab Ihya’ Ulumuddin,” *Jurnal Ilmiah Islam Futura* 20, no. 2 (2021): 254–75, <https://doi.org/10.22373/jiif.v20i2.6326>; N. Hidayah, “Konsep Ikhlas Menurut Imam Al-Ghazali Dan Relevansinya Terhadap Tujuan Pendidikan Islam,” *Khozanatu Al-Hikmah: Jurnal Ilmu Tarbiyah Dan Pendidikan* 2, no. 2 (2023): 126–38, <https://doi.org/10.51468/khozanatul-hikmah.v2i2.166>.

intermediate position in the sequence, whereas ikhlas is located at an advanced stage and should depend on a broader integration of preceding stations.

The study also responds to changes in contemporary religious learning. Digital religion research shows that spiritual practices increasingly circulate through mobile media, messaging groups, and visual learning environments ⁷. Digital humanities has expanded the methods available to Islamic studies through structured data, text analysis, and hybrid forms of human-machine interpretation ⁸. In mathematics education, the integration of Islamic values can strengthen contextual understanding and character-oriented learning, while models such as R-Math show that disciplinary concepts can be connected to Islamic jurisprudential and ethical contexts without reducing either domain to a decorative example ⁹. A Fibonacci-based model may consequently serve as both an analytical metaphor and a visual teaching device.

The central research question is: to what extent can the Fibonacci sequence provide an empirically defensible metaphor for the cumulative and progressive character of Sufi ethical development? Three subsidiary questions are addressed. First, do mean scores across the proposed stations form a graded pattern in which advanced stations are less readily attained? Second, can selected advanced stations be predicted by combinations of the two preceding stations, in a manner analogous to the Fibonacci recurrence rule? Third, how do participants describe the relationships among patience, trust, contentment, sincerity, and spiritual maturity? The study contributes a cautious interdisciplinary model: it does not claim that spiritual life is mathematically determined, but tests whether mathematical structure can clarify patterns that participants and Sufi ethical literature already describe in qualitative terms.

RESEARCH METHOD

⁷ H. A. Campbell, "The Dynamic Future of Digital Religion Studies," *Journal of Religion, Media and Digital Culture* 12, no. 1 (2023): 5–28, <https://doi.org/10.1163/21659214-bja10059>.

⁸ M. Lange et al., "Text Mining Approaches for Islamic Legal Texts: Opportunities and Challenges," *Digital Scholarship in the Humanities* 36, no. Suppl. 2 (2021): ii113–25, <https://doi.org/10.1093/llc/fqab053>; M. M. Saraçoğlu, "Islamic Studies in the Digital Humanities: Opportunities, Challenges, and Future Directions," *Journal of Islamic Studies* 33, no. 3 (2022): 345–67, <https://doi.org/10.1093/jis/etac034>; V. De Boer and L. Stork, "Hybrid Intelligence for Digital Humanities: Combining Human and Machine Capabilities," *Digital Scholarship in the Humanities* 39, no. 1 (2024): 145–63, <https://doi.org/10.1093/llc/fqad089>.

⁹ K. Kusno et al., "The Integration of Islamic Spiritual Values in Mathematics Learning to Develop Students' Character," *Journal for the Education of Gifted Young Scientists* 8, no. 4 (2020): 1511–21, <https://doi.org/10.17478/jegys.771693>; M. Surur et al., "R-Math: Integration of Shafi'i Jurisprudence with Mathematical Concepts in Islamic Education," *International Journal of Instruction* 18, no. 1 (2025): 89–108, <https://doi.org/10.29333/iji.2025.1816a>.

The study employed a sequential explanatory mixed-methods design. The first phase used quantitative measures to identify the distribution and relationships of maqamat scores. The second phase used interviews and participant observation to explain why the quantitative pattern appeared and how participants understood the progression of patience and sincerity. Sequential explanatory designs are appropriate when statistical relationships require contextual interpretation, especially in interdisciplinary research that combines measurement with lived experience ¹⁰.

The population consisted of approximately 200 active Jamaah Tabligh members organized in 15 local learning groups in Wonosobo, Kertek, and Wadaslintang. Fifty participants were selected purposively according to four criteria: at least two years of active membership, participation in khuruj on at least three occasions, willingness to provide informed consent, and an age between 18 and 60 years. Twelve participants were aged 18-30, twenty-five were aged 31-45, and thirteen were aged 46-60. Educational backgrounds ranged from primary education to postgraduate degrees. Eighteen participants had two to five years of membership, twenty had six to ten years, and twelve had more than ten years. This variation allowed the analysis to compare early, intermediate, and experienced practitioners.

The principal instrument was the 40-item Fibonacci-based Spiritual Development Scale (FSDS), containing five items for each of the eight proposed stations. Responses used a five-point Likert scale from strongly disagree to strongly agree. Two supplementary instruments assessed patience and sincerity. The patience measure incorporated behavioral persistence, restraint, and endurance, drawing on evidence that patience can be assessed as a multidimensional educational construct ¹¹. The sincerity measure focused on intention, freedom from self-display, and reduced dependence on praise, consistent with Islamic ethical analyses of *riya'* and *ikhlas* ¹². A semi-structured interview guide explored participants' spiritual histories, experiences of

¹⁰ S. Dawadi et al., "Mixed-Methods Research: A Discussion on Its Types, Challenges, and Criticisms," *Journal of Practical Studies in Education* 2, no. 2 (2021): 25–36, <https://doi.org/10.46809/jpse.v2i2.20>; M. Khabibullah, "Tahapan Dan Langkah-Langkah Penerapan Mixed Method Research: Studi Literatur," *QOMARUNA Journal of Multidisciplinary Studies* 2, no. 1 (2024): 69–86, <https://doi.org/10.62048/qjms.v2i1.55>.

¹¹ Bülbül, "Effects of the Patience Training Program on Patience and Well-Being Levels of University Students"; Eryilmaz and Basal, "Development and Validation of the Student Online Learning Patience Scale."

¹² Afna, "Riya Dalam Perspektif Imam Al-Ghazali: Studi Deskriptif Analitik Terhadap Kitab Ihya' Ulumuddin"; Hidayah, "Konsep Ikhlas Menurut Imam Al-Ghazali Dan Relevansinya Terhadap Tujuan Pendidikan Islam."

developing sabr and ikhlas, perceptions of relationships among stations, and responses to the Fibonacci metaphor.

Content validity was examined by three specialists in Sufism, psychometrics, and mathematics. The instruments were then piloted with 30 non-sample respondents from a comparable community. Internal consistency was satisfactory: $\alpha = .89$ for the FSDS, $\alpha = .85$ for the patience questionnaire, and $\alpha = .87$ for the sincerity questionnaire. Quantitative data were analyzed using descriptive statistics, Pearson correlations, multiple regression, independent-samples comparisons, one-way analysis of variance, and an exploratory path model. The significance level was set at .05. Qualitative data were coded thematically through familiarization, initial coding, theme development, review, definition, and interpretive synthesis. NVivo was used for data organization and auditability rather than as a substitute for human interpretation¹³.

Data collection took place over four months, from January to April 2025. The quantitative phase was completed during the first four weeks. Fifteen participants were subsequently selected for interviews based on high, medium, and low FSDS scores. Interviews lasted 60-90 minutes. Participant observation was conducted during weekly learning meetings and one three-day khuruj cycle. With administrator permission, the study also examined selected messages and shared religious materials in a community messaging group to understand how spiritual concepts circulated digitally. Integration occurred through a joint display that compared statistical and thematic findings. Ethical procedures included written informed consent, confidentiality, voluntary withdrawal, and the use of participant codes. These procedures followed contemporary concerns about transparent and proportionate ethical review in social research¹⁴.

RESULTS

The descriptive results show a consistent decline in mean scores as the model moves from foundational to advanced stations. Tawbah had the highest mean ($M = 4.12$), followed by wara' ($M = 3.98$), zuhd ($M = 3.67$), sabr ($M = 3.45$), tawakkal ($M = 3.21$), ridha ($M = 2.89$), ikhlas ($M = 2.56$), and ma'rifah ($M = 2.23$). Standard deviations increased from .65 for tawbah to 1.02 for ma'rifah. The declining means support the proposition of increasing difficulty, while the

¹³ D. Mortelmans, *Doing Qualitative Data Analysis with NVivo* (Springer Nature Switzerland, 2024), <https://doi.org/10.1007/978-3-031-66014-6>.

¹⁴ T. N. Susilawati et al., "Analisis Faktor-Faktor Yang Menghambat Kaji Etik Protokol Penelitian," *Jurnal Media Penelitian Dan Pengembangan Kesehatan* 34, no. 3 (2024): 654–62, <https://doi.org/10.34011/jmp2k.v34i3.2084>.

widening variability suggests that advanced stations are more dependent on individual history, interpretation, and sustained practice. The results do not imply that every person passes through identical stages; they indicate that participants found foundational commitments easier to affirm consistently than advanced states of contentment, sincerity, and spiritual knowledge.

Table 2. Descriptive scores for the proposed spiritual stations

Station	Fibonacci term	Mean	SD	Ratio to prior station
Tawbah	F(1) = 1	4.12	0.65	-
Wara'	F(2) = 1	3.98	0.72	0.97
Zuhd	F(3) = 2	3.67	0.81	0.92
Sabr	F(4) = 3	3.45	0.78	0.94
Tawakkal	F(5) = 5	3.21	0.85	0.93
Ridha	F(6) = 8	2.89	0.91	0.90
Ikhlas	F(7) = 13	2.56	0.95	0.89
Ma'rifah	F(8) = 21	2.23	1.02	0.87

The correlation pattern was hierarchical. The strongest relationships occurred between adjacent advanced stations: ikhlas and ma'rifah ($r = .88$), ridha and ikhlas ($r = .86$), tawakkal and ridha ($r = .84$), and sabr and tawakkal ($r = .81$). Correlations weakened as the distance between stations increased. Tawbah and ma'rifah, for example, were only weakly related ($r = .19$, $p < .05$). This pattern supports a proximal-transfer interpretation: stations that share immediate psychological and ethical requirements are more closely connected than stations separated by several intervening disciplines. The finding is consistent with accounts of maqamat as an interdependent network rather than a set of isolated labels ¹⁵.

Multiple regression provided a stricter test of cumulative dependence. Wara' and zuhd significantly predicted sabr: $\text{Sabr} = 0.42(\text{Wara}') + 0.51(\text{Zuhd}) + 0.89$. The model explained 68% of the variance, $R^2 = .68$, $F(2, 47) = 49.87$, $p < .001$. Both predictors contributed positively, with zuhd showing the stronger coefficient. The result suggests that perseverance is associated not only with cautious moral awareness but also with reduced attachment to outcomes. In

¹⁵ Nawir and Santalia, "Tasawuf Maqamat Dan Ahwal Serta Perkembangannya Dalam Dunia Islam"; Rian et al., "Tasawuf, Maqomat Wa Ahwal Serta Perkembangannya Dalam Dunia Islam."

practical terms, endurance was more stable among participants who reported both vigilance in conduct and a capacity to release excessive worldly dependence.

A second regression predicted ikhlas from tawakkal and ridha: $Ikhlas = 0.38(Tawakkal) + 0.55(Ridha) + 0.67$. The model explained 74% of the variance, $R^2 = .74$, $F(2, 47) = 66.23$, $p < .001$. Ridha was the stronger predictor. This result supports the view that sincerity is difficult to sustain when a person remains dissatisfied with outcomes or depends heavily on recognition. Trust provides an initial orientation, but contentment appears to reduce the psychological pressure to display piety, seek praise, or interpret service through personal success. The pattern aligns with research that treats sincerity as an advanced regulation of intention and purification from self-display¹⁶.

Membership duration was also associated with spiritual-development scores. The one-way ANOVA was significant, $F(2, 47) = 12.34$, $p < .001$. Participants with two to five years of membership had the lowest mean FSDS score ($M = 24.67$, $SD = 4.12$), followed by those with six to ten years ($M = 28.45$, $SD = 3.89$), while those with more than ten years had the highest mean ($M = 32.58$, $SD = 3.45$). Duration alone cannot establish causal development, because older or longer-term members may differ in motivation, social support, or prior religious experience. Nevertheless, the finding is compatible with the acceleration proposition: once foundational habits are consolidated, participants may integrate later virtues more efficiently.

Table 3. Key quantitative evidence for the Fibonacci-Maqamat model

Analytical test	Result	Interpretation
Adjacent-station correlations	Ikhlas-Ma'rifah $r = .88$; Ridha-Ikhlas $r = .86$; Sabr-Tawakkal $r = .81$	Proximal stations share stronger ethical and psychological requirements
Regression predicting Sabr	$R^2 = .68$; Wara' $\beta = .42$; Zuhd $\beta = .51$; $p < .001$	Patience is associated with both vigilance and detachment

¹⁶ Afna, "Riya Dalam Perspektif Imam Al-Ghazali: Studi Deskriptif Analitik Terhadap Kitab Ihya' Ulumuddin"; Hidayah, "Konsep Ikhlas Menurut Imam Al-Ghazali Dan Relevansinya Terhadap Tujuan Pendidikan Islam."

Analytical test	Result	Interpretation
Regression predicting Ikhlas	$R^2 = .74$; Tawakkal $\beta = .38$; Ridha $\beta = .55$; $p < .001$	Sincerity is associated with trust and especially contentment
Membership-duration ANOVA	$F(2, 47) = 12.34$, $p < .001$	Longer-term members recorded higher overall FSDS scores

The interviews produced three themes. The first was cumulative formation. Participants repeatedly explained that sincerity depended on capacities learned earlier. One experienced member stated, 'I could not become sincere before learning patience. After years of learning to endure, I became less dependent on praise.' This account does not reproduce the Fibonacci formula literally, but it expresses the same cumulative principle: later ethical stability draws on previous discipline. The second theme was accelerated transformation. Senior members reported that the earliest years required deliberate and sometimes exhausting self-regulation, while later difficulties were processed more quickly because established habits created momentum. This description resembles accounts of progressive purification and intensified spiritual orientation in Sufi education ¹⁷.

The third theme was holistic interdependence. Participants preferred metaphors such as a building, a tree, or a journey rather than a numerical sequence. One participant described tawbah as a foundation, patience and trust as supporting walls, and ma'rifah as a roof that could not stand independently. This metaphor is important because it prevents an overly rigid interpretation of the model. The spiritual stations are distinguishable for teaching and analysis, but they remain mutually corrective. Patience without sincerity can become self-display; sincerity without patience may remain an aspiration that collapses under pressure; trust without responsible effort can become fatalism. The Fibonacci model is strongest when it highlights integration, not when it is used to assign fixed rankings to persons.

The limited digital ethnography showed that participants already learned through short audio lectures, quotations, reminders, and peer discussion in messaging groups. However, digital materials tended to present virtues

¹⁷ Gül, "Education of Nafs in Sufism: Concepts, Methods, and Contemporary Applications"; Mulyadi et al., "Developing Islamic Character through Tazkiyah Al-Nafs: A Quasi-Experimental Study in Indonesian Islamic Schools"; Yalçinkaya, "Rumi's Conception of Happiness in the Mathnavi: A Progressive Spiritual Journey."

separately and rarely showed how one capacity supported another. A Fibonacci spiral or layered progression could therefore function as a discussion prompt in mobile learning: users might record reflective evidence for each station, identify weak links, and revisit prior practices before claiming advanced progress. Digital religion scholarship cautions that platforms reshape authority and attention, so such tools should support mentorship rather than replace it ¹⁸. Hybrid-intelligence approaches similarly emphasize that computational structure is most useful when combined with human interpretation and contextual judgment ¹⁹.

Interpretation, Implications, and Limitations

Taken together, the evidence supports the Fibonacci model as a disciplined metaphor. The declining means, stronger correlations between adjacent stations, predictive contribution of preceding stations, and experience-based differences all fit the proposed structure. Yet the model should not be interpreted as proof that spiritual development obeys a universal mathematical law. Statistical association cannot establish a fixed sequence, and self-report measures cannot directly verify inner sincerity or spiritual knowledge. The contribution is therefore conceptual and pedagogical: the model organizes a complex ethical tradition into a testable structure without claiming to replace theological interpretation.

The strongest theoretical contribution concerns cumulative ethics. Moral education often treats virtues as separate learning outcomes. The present findings suggest that advanced dispositions may be better understood as configurations of earlier capacities. Patience integrates restraint and detachment; sincerity integrates trust and contentment. This interpretation resonates with Al-Ghazali's emphasis on coordinated character formation and with empirical work on tazkiyah al-nafs as a progressive educational process ²⁰. It also explains why advanced stations showed greater variance: integration is more difficult than endorsement of a single foundational principle.

The study also contributes to mathematics education and Islamic pedagogy. Prior research demonstrates that mathematical understanding can be strengthened when concepts are placed in meaningful ethical and religious

¹⁸ Campbell, "The Dynamic Future of Digital Religion Studies."

¹⁹ De Boer and Stork, "Hybrid Intelligence for Digital Humanities: Combining Human and Machine Capabilities."

²⁰ Guseynov, "Al-Ghazali's Golden Rule in Ethics: Universality and Particularity"; Mulyadi et al., "Developing Islamic Character through Tazkiyah Al-Nafs: A Quasi-Experimental Study in Indonesian Islamic Schools."

contexts ²¹. Here, the direction of integration is reciprocal. Fibonacci is not used merely to decorate a religious lesson; its recurrence structure helps formulate hypotheses about cumulative development. At the same time, Sufi ethics gives the sequence a human and educational context. This reciprocal design is preferable to superficial Islamization because both domains retain their conceptual integrity.

For digital humanities, the model illustrates how formal structures can support interpretation without displacing it. Computational approaches to Islamic texts and hybrid intelligence frameworks encourage scholars to make patterns explicit, compare evidence, and document interpretive decisions ²². A future digital implementation could allow users to visualize relationships among stations, record longitudinal reflections, and compare qualitative narratives with scale scores. Such an application should avoid automated judgments about piety. Its appropriate function would be reflective scaffolding: prompting learners to examine whether claims of sincerity are supported by patience, trust, and contentment.

Several limitations qualify the conclusions. The sample was small, purposively selected, and restricted to one community; generalization to other Muslim groups requires replication. The cross-sectional design cannot demonstrate temporal movement through the stations. The FSDS is a new instrument and requires confirmatory factor analysis, measurement-invariance testing, and longitudinal validation. Self-report responses may be affected by social desirability, particularly for virtues such as sincerity. The mapping of maqamat also reflects one interpretive synthesis among several possible orders. Finally, the regression analogy resembles the Fibonacci rule but does not reproduce mathematical addition in a literal sense. Future research should compare alternative sequences, include behavioral and peer-report indicators, and follow participants across several years.

Despite these limitations, the model offers practical value. Educators can use it to explain why advanced spiritual language must be grounded in observable disciplines. Mentors can use it diagnostically by asking which preceding capacities are insufficiently developed when a learner struggles with

²¹ Kusno et al., "The Integration of Islamic Spiritual Values in Mathematics Learning to Develop Students' Character"; Surur et al., "R-Math: Integration of Shafi'i Jurisprudence with Mathematical Concepts in Islamic Education."

²² Lange et al., "Text Mining Approaches for Islamic Legal Texts: Opportunities and Challenges"; Saraçoğlu, "Islamic Studies in the Digital Humanities: Opportunities, Challenges, and Future Directions"; De Boer and Stork, "Hybrid Intelligence for Digital Humanities: Combining Human and Machine Capabilities."

patience or sincerity. Researchers can use the model to generate explicit hypotheses rather than relying only on broad statements about spiritual growth. The visual sequence may also support intergenerational teaching because it translates abstract maqamat into a form that can be discussed, questioned, and revised. Its value lies in disciplined simplification: making a complex tradition more accessible while preserving the need for interpretation, guidance, and ethical humility.

DISCUSSION

Conceptual Framework: Fibonacci and Maqamat

The conceptual model maps eight Fibonacci terms onto eight maqamat. The mapping begins with *tawbah* and *wara'* as two foundational orientations. *Tawbah* is the deliberate return from error and the commitment to ethical change; *wara'* is vigilance toward doubtful or morally risky conduct. *Zuhd* follows as a reduction of excessive attachment, symbolically integrating the corrective force of repentance and the restraint of vigilance. *Sabr* then combines restraint and detachment into the capacity to persist in obedience and endure difficulty. *Tawakkal* develops when detachment and patience make it possible to rely on God without abandoning responsible action. *Ridha* deepens this trust into a stable acceptance of divine determination. *Ikhlas* emerges when trust and contentment reduce the need for social approval, and *ma'rifah* represents a mature, integrated awareness that depends on both contentment and sincerity.

This arrangement is an interpretive model rather than a definitive taxonomy. Sufi authors differ in the number and ordering of stations, and spiritual experience does not unfold as a mechanically uniform ladder. Nevertheless, recent discussions of maqamat consistently emphasize structured formation and the interdependence of ethical states²³. The Fibonacci analogy is therefore used at the level of pedagogy and hypothesis generation. It provides three propositions. The first is cumulative dependence: later stations should be positively associated with earlier ones, especially with immediately preceding stations. The second is increasing difficulty: mean scores should decline as the model moves toward advanced stations. The third is experiential acceleration: long-term practitioners may report that progress becomes more integrated and efficient after foundational habits have stabilized, similar to the increasing magnitude of Fibonacci terms.

Table 1. Fibonacci-Maqamat conceptual mapping

²³ Nawir and Santalia, "Tasawuf Maqamat Dan Ahwal Serta Perkembangannya Dalam Dunia Islam"; Rian et al., "Tasawuf, Maqomat Wa Ahwal Serta Perkembangannya Dalam Dunia Islam."

Fibonacci term	Spiritual station	Operational meaning
F(1) = 1	Tawbah	Recognition of error and commitment to ethical return
F(2) = 1	Wara'	Moral vigilance and avoidance of doubtful conduct
F(3) = 2	Zuhd	Reduced attachment to material status and outcomes
F(4) = 3	Sabr	Perseverance, restraint, and resilience in practice
F(5) = 5	Tawakkal	Reliance on God combined with responsible effort
F(6) = 8	Ridha	Stable acceptance of divine determination
F(7) = 13	Ikhlas	Purification of intention from display and praise-seeking
F(8) = 21	Ma'rifah	Integrated spiritual understanding and awareness

The model is particularly useful for distinguishing accumulation from simple linear progression. A linear model assumes that each stage adds a constant amount. Fibonacci progression instead suggests that development incorporates multiple prior capacities. For example, patience may require both vigilance and detachment, while sincerity may require both trust and contentment. This interpretation is compatible with ethical accounts in which virtues mutually reinforce one another. Al-Ghazali's moral framework stresses habituation and the coordination of knowledge, intention, and action ²⁴. Research on purification of the self similarly reports that advanced character outcomes are strengthened when basic practices are internalized over time ²⁵. Rumi's depiction of happiness and spiritual ascent also presents transformation as an intensifying journey rather than a collection of disconnected states ²⁶.

The pedagogical advantage of the model is visual concreteness. Spiritual terms such as sincerity and contentment are difficult to observe directly,

²⁴ Guseynov, "Al-Ghazali's Golden Rule in Ethics: Universality and Particularity."

²⁵ Mulyadi et al., "Developing Islamic Character through Tazkiyah Al-Nafs: A Quasi-Experimental Study in Indonesian Islamic Schools."

²⁶ E. Yalçinkaya, "Rumi's Conception of Happiness in the Mathnavi: A Progressive Spiritual Journey," *Journal of Sufi Studies* 13, no. 1 (2024): 45–72, <https://doi.org/10.1163/22105956-20241003>.

especially for learners who are unfamiliar with classical terminology. A spiral, sequence, or layered diagram can show that advanced ethical dispositions presuppose earlier work and cannot be reduced to verbal claims. Technology-supported investigations of the Golden Ratio demonstrate that visualization can reveal relationships that remain obscure in purely abstract explanation ²⁷. Likewise, digital religion and digital humanities research suggests that structured visual models can support reflection, discussion, and guided learning when they remain subordinate to interpretive judgment ²⁸.

CONCLUSION

This study proposed and tested a Fibonacci-Maqamat model for understanding patience and sincerity in Sufi ethics. The model mapped *tawbah*, *wara'*, *zuhd*, *sabr*, *tawakkal*, *ridha*, *ikhlas*, and *ma'rifah* onto the first eight Fibonacci terms. Quantitative findings supported three central propositions. First, advanced stations were more difficult to attain, as shown by declining means and increasing variability. Second, development was cumulative: *wara'* and *zuhd* explained substantial variance in *sabr*, while *tawakkal* and *ridha* explained substantial variance in *ikhlas*. Third, experienced participants recorded higher overall spiritual-development scores and described greater integration after foundational habits had stabilized.

Qualitative evidence clarified that participants did not experience spiritual life as a rigid numerical ladder. They described it as a building, tree, or journey in which each part supported the others. The Fibonacci sequence is therefore best understood as a pedagogical and analytical metaphor, not as a deterministic law or a device for ranking piety. Used carefully, it can help educators connect mathematics, Islamic ethics, and digital learning; help mentors diagnose relationships among virtues; and help researchers formulate testable models of cumulative spiritual formation. Further longitudinal and cross-community studies are needed to validate the FSDS, compare alternative mappings of *maqamat*, and determine whether the observed patterns remain stable over time.

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²⁷ Abramovich and Freiman, "Exploring the Golden Ratio with Technology: Connecting Mathematics to Art, Nature, and Beyond."

²⁸ Campbell, "The Dynamic Future of Digital Religion Studies"; De Boer and Stork, "Hybrid Intelligence for Digital Humanities: Combining Human and Machine Capabilities."

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