



IMPACT OF EDUCATION CONTENT MARKETING AND COMMUNITY ENGAGEMENT ON USER ADOPTION IN THE NIGERIAN CRYPTO ECOSYSTEM: A STUDY OF AZZA

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ABSTRACT :

Nigeria is one of the world's leading cryptocurrency markets, yet high awareness of digital assets does not automatically translate into active and sustained platform use. Knowledge barriers, trust deficits, security concerns, and complicated onboarding processes continue to create an awareness–adoption gap. This study examined the impact of education content marketing and community engagement on user adoption in the Nigerian cryptocurrency ecosystem, using Azza, a WhatsApp-based cryptocurrency trading platform, as a case study. The study was anchored on the Technology Acceptance Model, the Unified Theory of Acceptance and Use of Technology, and Diffusion of Innovation theory. A quantitative content-analysis and correlational design was applied to 181 publicly accessible content units published on Azza's Twitter (X), Medium, and YouTube channels between January and December 2025. Standardised engagement rates were used as proxies for awareness, behavioural intention, and onboarding intent, while structured observations of the WhatsApp community supplied qualitative evidence on trust and social validation. Descriptive statistics, an independent-samples t-test, Pearson correlations, multiple linear regression, and one-way analysis of variance were conducted using IBM SPSS Statistics. Tutorial content recorded a higher mean engagement rate than promotional content, but the difference was not statistically significant, $t(156) = 0.852, p = .395$. Content quality was a significant positive predictor of engagement in the focused model ($\beta = .342, p < .001$) and the full model ($\beta = .201, p = .009$). Call-to-action presence was positively associated with engagement ($r = .210, p = .005$). Platform differences were substantial, $F(2, 178) = 44.26, p < .001$, with Medium articles recording a mean engagement rate approximately nineteen times that of Twitter posts. Qualitative observations indicated that peer support, user testimonials, and moderator responsiveness reinforced trust and social validation. The study concludes that education-first, community-reinforced marketing can support cryptocurrency adoption intent when content quality and channel choice are prioritised.

Keywords: Education content marketing; community engagement; cryptocurrency adoption; fintech marketing; user engagement; Nigeria

1. INTRODUCTION

Cryptocurrency has developed from a specialised digital experiment into a significant component of the global financial system. Its importance is particularly visible in emerging markets, where citizens often use digital assets to respond to currency depreciation, expensive cross-border payments, and limited access to conventional financial services. Nigeria has become one of the most prominent examples of this trend. Chainalysis (2024a, 2024b) ranked Nigeria among the leading countries in grassroots cryptocurrency adoption and reported substantial transaction activity within Sub-Saharan Africa. At the same time, the persistence of financial exclusion and reliance on informal financial systems creates an environment in which alternative financial technologies may appear both necessary and risky (EFInA, 2023).

High adoption rankings, however, can conceal a conversion problem. Awareness of cryptocurrency does not necessarily mean that potential users understand how to transact safely, trust a platform sufficiently to register, complete onboarding, or become repeat users. Cryptocurrency products are technically and financially complex, and potential users must assess security, price volatility, platform reliability, regulatory uncertainty, and the possibility of fraud. The problem is therefore not merely how to attract attention, but how to convert attention into informed behavioural intention and sustained platform use.

Education content marketing offers one possible response to this problem. Rather than relying primarily on promotional claims, education content marketing uses tutorials, explanatory articles, demonstrations, security guidance, and step-by-step materials to reduce knowledge barriers and enable informed action. Pulizzi (2012) described content marketing as the creation and distribution of valuable information that attracts and engages an audience without depending on direct selling. Holliman and Rowley (2014) further argued that effective digital content must be useful, relevant, timely, and credible. In technology and financial-services contexts, these qualities can improve users' perception that a product is understandable and useful, which are central conditions in the Technology Acceptance Model (Davis, 1989).

Community engagement may complement educational content by reducing uncertainty through interaction. Online communities enable users to ask questions, receive peer support, observe other users' experiences, and evaluate the responsiveness of platform representatives. Research on online brand communities shows that community identity, trust, participation, and commitment can strengthen engagement and loyalty (Zhang & Li, 2022; Zheng et al., 2015). In fintech adoption, social influence and trust are particularly important because users are deciding whether to place financial value within

unfamiliar systems (Almutairi, 2025; Etuk, 2025).

Azza provides a useful case through which to study these relationships. The platform enables cryptocurrency transactions through WhatsApp and uses educational materials across Twitter (X), Medium, and YouTube, supported by a WhatsApp community. This model combines a conversational interface with public education and community-based assistance. It is therefore relevant to the Nigerian context, where WhatsApp is a familiar digital environment and where knowledge and trust barriers may prevent users from moving from awareness to adoption.

Existing studies have examined cryptocurrency awareness, perceived usefulness, ease of use, trust, social influence, and technology acceptance (Atellu, 2024; Shahzad et al., 2024). Nigerian studies have also considered social influence and marketing in fintech adoption (Etuk, 2025; Kanu et al., 2025). Nevertheless, limited empirical work isolates the quality of education content and the role of community interaction as simultaneous adoption-related variables within a Nigerian cryptocurrency platform. There is also limited research on WhatsApp-native financial products and on the use of observable digital engagement data as proxies for early stages of adoption.

This study therefore examined the impact of education content marketing and community engagement on user adoption in the Nigerian cryptocurrency ecosystem, using Azza as a case study. User adoption was treated as a multi-stage construct involving awareness, behavioural intention, trust, social validation, and onboarding intent. Because direct platform conversion data were not available in the source study, publicly observable engagement metrics were used as proxies for early adoption outcomes. The study assessed whether educational content differed from promotional content in engagement performance, whether content quality and calls-to-action predicted engagement, whether platform choice influenced outcomes, and whether community interactions provided evidence of trust formation and social validation.

2. LITERATURE REVIEW AND THEORETICAL FRAMEWORK

2.1 Education Content Marketing and User Adoption

Education content marketing is the strategic use of informative materials to improve audience understanding and support informed action. In complex product categories, content does more than create awareness; it can reduce uncertainty, clarify benefits, and demonstrate use. Holliman and Rowley (2014) found that useful, relevant, and timely content is central to digital marketing effectiveness, while Vinerean (2017) positioned content strategy as a means of building relationships rather than generating only short-term promotion. Li et al. (2022) similarly demonstrated that the effectiveness of digital content can shape online purchase intention when users perceive the material as useful and engaging.

Within cryptocurrency and fintech, education is especially important because the adoption decision requires technical and financial understanding. Shahzad et al. (2024) found that cryptocurrency awareness and trust were closely connected to acceptance and adoption. Atellu (2024) reported that perceived utility and ease of use predicted cryptocurrency adoption in Kenya, reinforcing the view that users are more likely to adopt when they understand both the value and the operation of a platform. In Nigeria, Kanu et al. (2025) linked content creation and endorsement strategies to the adoption of fintech offerings, although their focus was not specifically on cryptocurrency education.

Content quality is therefore expected to matter more than the mere presence of educational materials. In this study, quality referred to instructional depth, accuracy, clarity, relevance, and actionability. A high-quality content unit should enable the user to understand a concept or complete a platform-related task, whereas low-quality content may be technically educational but too superficial to reduce adoption friction.

2.2 Community Engagement, Trust, and Social Validation

Community engagement refers to interaction among a platform, its users, and prospective users through questions, responses, peer assistance, testimonials, and shared experiences. Zheng et al. (2015) showed that engagement in online brand communities can influence loyalty through community commitment. Zhang and Li (2022) also linked online brand-community identity and trust to customer engagement and loyalty. These findings suggest that communities provide relational value that is distinct from one-way content distribution.

The relevance of community engagement is heightened in financial technology because trust is an important mediator of adoption. Almutairi (2025) found that social influence contributed to trust and fintech adoption, while Etuk (2025) reported that social influence significantly predicted mobile-fintech adoption in Nigeria. In a cryptocurrency community, visible reports of successful transactions, peer explanations, and timely responses to security concerns can operate as social validation. These observable experiences may reduce uncertainty for prospective users and support movement from awareness to behavioural intention.

2.3 Theoretical Framework

The Technology Acceptance Model proposes that perceived usefulness and perceived ease of use are central determinants of technology acceptance (Davis, 1989). Education content can strengthen perceived usefulness by showing the practical value of a platform and can strengthen perceived ease of use by explaining procedures in understandable terms. The model is therefore appropriate for analysing how content quality may influence engagement and onboarding intent.

The Unified Theory of Acceptance and Use of Technology adds performance expectancy, effort expectancy, and social influence to the explanation of behavioural intention (Venkatesh et al., 2003). Its social-influence construct is relevant to the role of communities, peer testimony, and moderator interaction. Diffusion of Innovation theory explains how innovations spread through communication channels and how observability, opinion leadership, and reduced uncertainty affect the rate of adoption (Rogers, 2003). Together, the three theories support a framework in which educational content reduces knowledge barriers, while community engagement reduces trust barriers and makes successful adoption visible to others.

Table 1. Study hypotheses and operational tests

Hypothesis	Proposed relationship	Operational test
H1	Education content marketing → awareness and understanding	Tutorial/educational versus promotional engagement rates
H2	Education content marketing → behavioural intention	Quality score and CTA relationships with engagement rate
H3	Community engagement → user trust	Structured qualitative WhatsApp observations
H4	Community engagement → social validation	Structured qualitative WhatsApp observations and public engagement signals
H5	Content quality → onboarding completion intent	Regression of engagement rate on quality and step-by-step formatting

3. METHODOLOGY

3.1 Research Design and Data Sources

The study adopted a quantitative content-analysis and correlational design, supplemented by structured qualitative observation of community interactions. Quantitative content analysis was selected because it enables systematic classification of digital communication and the comparison of observable audience responses across content characteristics (Krippendorff, 2018; Neuendorf, 2017). The unit of analysis was an individual content item published through Azza's official digital channels.

The dataset covered January to December 2025 and contained 181 eligible content units. Twitter (X) contributed 139 items, Medium contributed 24 articles, and YouTube contributed 18 videos. Twenty-one Twitter threads were decomposed into individual tweets for granular engagement tracking. Eligible content had to originate from an official Azza channel, remain publicly accessible, and fall within the study period. The source project included educational, promotional, and announcement content in the final coded dataset.

The 12-month coverage allowed the researcher to observe content performance across Azza's early growth period. Although the source methodology described a time-series component, the inferential results reported in the project were conducted at the content-unit level rather than as a formal time-series model.

3.2 Coding Instrument and Variables

A structured social-media analytics tracker and content-analysis codebook were used to record platform, content type, topic, quality score, CTA presence, step-by-step-guide status, content format, view count, and engagement rate. Content type was classified as tutorial/educational, promotional, or announcement. Content topics were classified as trading/finance, product features/onboarding, events/bounties, security, or identity/Azza names. Content quality was scored on a five-point scale based on accuracy, clarity, usefulness, relevance, and actionability, adapted from the content-quality principles discussed by Holliman and Rowley (2014).

Engagement rate was the principal quantitative outcome. It served as a proxy for awareness, behavioural intention, and onboarding intent, rather than as proof of completed registration or transaction activity. This distinction is important: digital engagement indicates attention and a propensity to act, but it does not establish that a user completed the adoption process. Platform-standardised engagement measures were used in the source dataset to enable comparison across Twitter, Medium, and YouTube.

A standardized content analysis codebook was developed to promote consistency and replicability in the classification of content type, topic, quality, call-to-action presence, and instructional format. Content validity was supported through expert review. Although the research design initially proposed inter-rater reliability assessment using Cohen's kappa, an observed inter-rater coefficient was not available in the final dataset because the retained coding records contain only a single set of classifications. This is acknowledged as a limitation of the study.

3.3 Community Observation and Ethics

Community engagement was examined through 12 structured WhatsApp observation windows distributed across the study period. The observations focused on recurring interaction patterns, including peer-to-peer problem resolution, user testimonials, moderator responsiveness, security discussions, and social proof. Individual messages were not exported, reproduced, or attributed to users.

Only publicly accessible social-media metrics were analysed quantitatively, and no personally identifiable information was retained during this study.

3.4 Data Analysis

IBM SPSS Statistics version 25 was used for analysis (IBM Corp., 2017). Frequencies, percentages, means, standard deviations, and ranges described the content profile and engagement measures. An independent-samples t-test compared tutorial/educational content with promotional content. Pearson

correlation examined associations among quality score, CTA presence, step-by-step formatting, view count, and engagement rate. Multiple linear regression evaluated the predictive contribution of content quality and formatting and then estimated a fuller model containing quality score, CTA presence, step-by-step status, content format, and platform. One-way ANOVA and Tukey HSD comparisons assessed platform-level differences. Statistical significance was set at $p < .05$. The source analysis reported violation of homogeneity of variance for the platform ANOVA; therefore, the result is reported with caution and should ideally be checked with a robust alternative before final journal submission.

4. RESULTS

4.1 Content Profile

All 181 eligible content units were retrieved, coded, and retained. Tutorial and educational content accounted for 72.9% of the dataset, while promotional content represented 14.4% and announcements 12.7%. Trading and finance was the most common topic, followed by product features and onboarding. The mean quality score was 3.60 ($SD = 0.72$). Only 9.9% of content units received the highest quality classification, indicating substantial room for improvement. A CTA appeared in 40.3% of the content, and 37.6% used step-by-step formatting.

Table 2. Profile of the analysed content units (N = 181)

Variable	Category	n	%
Platform	Twitter (X)	139	76.8
	Medium	24	13.3
	YouTube	18	9.9
Content type	Tutorial/Educational	132	72.9
	Promotional	26	14.4
	Announcement	23	12.7
Topic	Trading/Finance	69	38.1
	Product Features/Onboarding	53	29.3
	Events/Bounties	41	22.7
	Security	11	6.1
	Identity/Azza Names	7	3.9
CTA present	Yes	73	40.3
Step-by-step guide	Yes	68	37.6
Format	Text	148	81.8
	Video	28	15.5
	Audio	5	2.8

4.2 Engagement Patterns Across Platforms

Across all content units, mean view count was 1,810.52 ($SD = 8,343.98$), with values ranging from 4 to 103,100. Mean engagement rate was 6.99% ($SD = 20.80$), ranging from 0.00% to 193.75%. The wide dispersion reflected substantial differences among platforms and the influence of high-performing content items. Medium recorded the highest mean engagement rate at 37.47%, followed by YouTube at 5.14% and Twitter at 1.96%. Medium's mean was approximately nineteen times the Twitter mean.

Table 3. Engagement rate by platform

Platform	n	Mean (%)	SD	Minimum	Maximum
Medium	24	37.47	46.80	0.00	193.75
Twitter (X)	139	1.96	1.13	0.34	5.45

Platform	n	Mean (%)	SD	Minimum	Maximum
YouTube	18	5.14	9.31	0.00	40.00
Total	181	6.99	20.80	0.00	193.75

4.3 Hypothesis Tests and Predictive Models

Tutorial/educational content produced a higher mean engagement rate ($M = 7.71\%$, $SD = 22.62$) than promotional content ($M = 3.88\%$, $SD = 7.76$). However, the difference was not statistically significant, $t(156) = 0.852$, $p = .395$, 95% CI $[-5.05, 12.71]$. H1 was therefore not supported. The high variability within the educational category, which combined high-performing Medium articles with lower-performing Twitter posts, reduced the ability of a simple group comparison to detect a difference.

Content quality demonstrated a moderate positive relationship with engagement rate, $r(179) = .339$, $p < .001$. CTA presence was also positively associated with engagement, $r(179) = .210$, $p = .005$. Step-by-step formatting was not significantly correlated with engagement, $r(179) = .077$, $p = .305$. These results support the importance of substantive content quality and a clear behavioural prompt, but do not support the view that instructional structure alone is sufficient.

The focused regression model containing quality score and step-by-step formatting was statistically significant, $F(2, 178) = 11.57$, $p < .001$, and explained 11.5% of the variance in engagement rate. Quality score was a significant positive predictor ($B = 9.868$, $\beta = .342$, $p < .001$), while step-by-step formatting was not significant ($B = -0.446$, $\beta = -.010$, $p = .887$). Each one-unit increase in quality score was associated with a 9.87 percentage-point increase in engagement rate, holding formatting constant.

The full model explained 26.0% of engagement-rate variance, $R^2 = .260$, adjusted $R^2 = .239$, $F(5, 175) = 12.31$, $p < .001$. Platform was the strongest predictor ($\beta = -.420$, $p < .001$), followed by content quality ($\beta = .201$, $p = .009$). CTA presence, step-by-step status, and format were not independently significant after the other predictors were controlled. Platform was coded as reported in the source dataset; because platform is nominal, a dummy-coded sensitivity model should be estimated before final submission.

A one-way ANOVA confirmed significant platform differences, $F(2, 178) = 44.26$, $p < .001$. Tukey comparisons indicated that Medium significantly outperformed Twitter and YouTube (both $p < .001$), whereas Twitter and YouTube did not differ significantly ($p = .738$). Levene's test was significant, indicating unequal variances; a Welch ANOVA or another robust procedure is recommended as a sensitivity check.

Table 4. Summary of quantitative results

Analysis	Key statistic	Interpretation
Educational vs promotional content	$t(156) = 0.852$, $p = .395$	Higher educational mean, but not statistically significant
Quality–engagement correlation	$r = .339$, $p < .001$	Significant positive relationship
CTA–engagement correlation	$r = .210$, $p = .005$	Significant positive relationship
Focused regression	$R^2 = .115$; $F(2,178) = 11.57$, $p < .001$	Quality significant ($\beta = .342$); step-by-step not significant
Full regression	$R^2 = .260$; $F(5,175) = 12.31$, $p < .001$	Platform ($\beta = -.420$) and quality ($\beta = .201$) significant
Platform ANOVA	$F(2,178) = 44.26$, $p < .001$	Medium significantly higher than Twitter and YouTube

4.4 Community Engagement, Trust, and Social Validation

Hypotheses concerning community-driven trust and social validation could not be tested quantitatively because WhatsApp interaction logs were not extracted. Across the 12 structured observation windows, however, three recurring patterns were documented: experienced users responded to questions raised by newer users, users voluntarily shared successful transaction experiences, and moderators responded to security and transaction concerns. These observations are directionally consistent with the proposed relationship between community engagement and trust. The repeated visibility of successful use also provided social validation consistent with the observability mechanism in Diffusion of Innovation theory. Because the evidence is qualitative and no individual-level conversion data were collected, H3 and H4 remain empirically inconclusive rather than statistically confirmed.

5. DISCUSSION

5.1 Content Quality as the Primary Adoption-Related Variable

The strongest and most consistent finding is that content quality matters more than the mere classification of content as educational. Quality score was

positively related to engagement in the correlation analysis and remained significant in both regression specifications. This finding supports the argument that users respond to content when it clearly explains value, reduces complexity, and provides reliable guidance. It is consistent with the Technology Acceptance Model, because useful and understandable education can strengthen perceived usefulness and perceived ease of use (Davis, 1989). It also aligns with Holliman and Rowley's (2014) view that digital content must be useful, relevant, and credible to influence action.

The non-significant comparison between educational and promotional content adds an important qualification. Labelling a post "educational" does not guarantee that it will influence users. The educational category contained both deep, high-performing articles and lower-performing short posts. The result therefore suggests that educational intent must be accompanied by quality, depth, and appropriate distribution. This distinction helps explain the awareness–adoption gap: broad exposure may create familiarity, but adoption intent is more likely to emerge when users receive enough information to understand the product and evaluate risk.

5.2 Platform Choice and the Adoption Journey

Platform choice produced the largest predictive effect in the full model. Medium articles substantially outperformed Twitter and YouTube in mean engagement rate. Within the study's theoretical framework, the platforms may serve different functions in the adoption journey. Twitter can support the knowledge stage of diffusion by distributing short, highly visible information, while Medium can support persuasion and decision by providing the depth required to evaluate usefulness, security, and process. The result is consistent with research showing that social-media engagement differs by platform type and use context (Voorveld et al., 2018).

The finding should not be interpreted as evidence that Medium is universally superior or that Twitter should be abandoned. Platform engagement rates can use different denominators and audience behaviours, and the dataset included far fewer Medium articles than Twitter posts. The practical implication is that a multi-stage content system may be more effective than a single-channel strategy: short-form content can create reach and direct users to deeper educational resources, while long-form content can support consideration and onboarding readiness.

5.3 Calls-to-Action and Behavioural Intention

CTA presence showed a significant positive bivariate association with engagement, suggesting that users are more likely to respond when educational content provides a clear next step. This finding is compatible with the behavioural-intention emphasis of UTAUT (Venkatesh et al., 2003). However, CTA presence was no longer significant in the full regression model after quality and platform were included. The result implies that a CTA is helpful but cannot compensate for weak content or an unsuitable channel. Action prompts appear most useful when they conclude content that has already established relevance and reduced uncertainty.

5.4 Community as a Trust-Building Layer

The qualitative observations suggest that Azza's WhatsApp community operates as a trust-building layer between public awareness and platform use. Peer assistance, testimonials, and responsive moderation make successful transactions visible and allow prospective users to observe how problems are resolved. These patterns are consistent with online-community research linking participation, trust, engagement, and loyalty (Zhang & Li, 2022; Zheng et al., 2015), as well as fintech-adoption research emphasising social influence and trust (Almutairi, 2025; Etuk, 2025). Nevertheless, the study cannot estimate the size of this effect or demonstrate that observed interactions caused adoption. The community findings should therefore be treated as explanatory qualitative evidence that requires direct quantitative testing.

5.5 Theoretical and Managerial Implications

The study extends technology-adoption reasoning by treating the communication environment surrounding a platform as an antecedent to adoption beliefs. Content quality may shape perceived usefulness and ease of use before a prospective user interacts deeply with the product. Community engagement may complement these beliefs by providing social influence, observable evidence, and trust. The combined framework therefore positions education content as a mechanism for reducing knowledge barriers and community engagement as a mechanism for reducing trust barriers.

For Azza and similar Nigerian fintech platforms, the results support an education-first strategy that prioritises editorial quality over publishing volume. Long-form guides should address security, onboarding, trading procedures, fees, and common user concerns in clear language. Short-form posts should operate as discovery and distribution tools that direct users to deeper resources. Educational content should include relevant next steps, while community moderators should maintain visible, timely, and accurate support. These practices should be evaluated against actual registrations, verification completion, first transactions, and retention rather than engagement alone.

For regulators and financial-inclusion stakeholders, the findings suggest that responsible consumer education and accessible support systems can complement formal regulation. Cryptocurrency education should not encourage speculative behaviour; it should improve users' understanding of risk, security, platform processes, and consumer protection. A stronger evidence base linking education to actual adoption and user outcomes would help distinguish informed inclusion from exposure-driven participation.

6. CONCLUSION

This study examined the impact of education content marketing and community engagement on user adoption in the Nigerian cryptocurrency ecosystem using Azza as a case study. The findings show that the effectiveness of education content is not determined simply by whether a content item is instructional or promotional. Content quality and platform choice were the most consistent quantitative predictors of engagement, while CTA presence

was positively associated with engagement at the bivariate level. Medium articles generated substantially higher mean engagement than Twitter and YouTube content, indicating that depth of education may be important for moving users from awareness toward informed behavioural intention. The WhatsApp community observations further suggested that peer support, user testimonials, and moderator responsiveness contribute to trust and social validation. These community relationships could not be quantified within the study's ethical and data-access constraints, so they remain directional rather than conclusive findings.

Overall, the study supports a content-led, community-reinforced approach to cryptocurrency marketing in Nigeria. The most defensible conclusion is not that content engagement equals adoption, but that high-quality education, appropriate channel selection, clear next steps, and visible community support are associated with the early conditions from which adoption can develop. Future evaluation should connect these communication variables to verified registrations, completed onboarding, first transactions, retention, and user welfare.

7. LIMITATIONS AND DIRECTIONS FOR FUTURE RESEARCH

The study relied on engagement metrics as proxies for awareness, behavioural intention, and onboarding intent. These measures do not establish completed adoption. Future studies should combine public engagement data with anonymised platform-side conversion outcomes.

The analysis focused on one platform during one calendar year. Comparative studies across Nigerian and African cryptocurrency platforms would improve generalisability and reveal whether the observed relationships are specific to Azza's WhatsApp-native model.

WhatsApp community interactions were observed but not quantitatively extracted. With informed consent, data-protection safeguards, and platform cooperation, future research could use anonymised surveys, interviews, or sentiment analysis to measure trust and social validation directly.

The engagement distributions differed substantially across platforms, and the homogeneity-of-variance assumption was violated in the ANOVA. The platform predictor also appears to have been entered as a single coded variable in the source regression. Before submission, the dataset should be reanalysed using dummy-coded platform variables and robust procedures such as Welch ANOVA, heteroskedasticity-consistent standard errors, or suitable transformed models.

The quality score depended partly on human judgement. The source project specified inter-rater reliability procedures but did not report the observed coefficient. The final manuscript should include the actual Cohen's kappa value and, where possible, an independent replication of the coding.

The design was observational and correlational. Controlled content experiments, A/B tests, longitudinal panels, and mixed-methods studies would provide stronger evidence about causal relationships among education, community engagement, and adoption.

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