Using Sentiment Analysis to Evaluate Digital Content as Informal e-Learning on Social Media

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Manuscript received March 13, 2025; revised April 2, 2025; accepted May 20, 2025; published October 21, 2025

***Abstract*—The final phase of Type 1 design and developmental research in this study aims to evaluate the effectiveness of digital content, including infographics and videos, from a state-level Zakat institution for informal learning via social media platforms. Evidence of netizens' informal, self-directed learning towards infographics and videos is vital in fostering the digitalisation of knowledge and information that meets the needs beyond conventional educational settings. For this purpose, sentiment analysis is employed to assess the emotional tone of user comments and reactions to digital content. Sentiment analysis evaluated the effectiveness of eleven infographics and seven videos of digital content developed for the institution's official Facebook page. The sentiments towards the graphical information and presentation quality were evaluated using a lexicon-based approach, where statistical analysis is based on accumulated Facebook emojis. Findings from a one-week 'like' survey revealed high interest towards digital content. Nevertheless, the videos received more views, likes, and shares than the infographics, despite having fewer topics to cover. High ratings of 'like' and 'love' for the videos also implied the netizens' preference towards multimedia-integrated content over static images. The high volume of engagements demonstrated the broad reach of the content, which is a key target of the body's digitalisation initiatives aimed at educating netizens about Zakat, a religious obligation for adult Muslims to eradicate poverty. Suggestions are made to ensure the production of high-quality digital content for informal learning through social media.**

***Keywords*—informal learning, digital content, sentiment analysis, social media, emoji**

I. Introduction

We are now embracing Education 5.0, which builds upon the technological advancements of Education 4.0 while emphasising a more human-centred, socially responsible approach to learning. Knowledge and skills are acquired in early childhood through social interaction, cultural practices, and experiential engagement, as individuals construct meaning through self-directed exploration and real-world experiences [1]. We engage with diverse information sources to acquire new skills, adopt innovative methods, solve problems, and share knowledge within and beyond formal education. Much of this learning occurs informally, outside structured environments, and is referred to as informal learning [2]. In this evolving landscape, sentiment analysis presents a promising method for evaluating learners' engagement and reactions to digital content shared on social media, offering insights into the nature and quality of informal e-learning.

Informal learning is ubiquitous, accessible, relaxed, and independent in a natural environment. In contrast to formal learning, informal learning can occur without notice and is often considered more effective [3]. Informal learning refers to the education and experience gained through various activities in daily life. This type of learning can occur through interaction with the environment, such as sending messages via WhatsApp to others or observing what is happening around humans, including looking at pictures, watching movies, or listening to audio [4, 5]. These activities illustrate the motive behind informal learning, which is to enrich one's perceptions and thoughts.

Informal learning is usually characterised by being learner-centred, non-institutionalised, and unstructured. It commonly takes place in authentic, socially mediated environments without formal assessment, certification, or accreditation [6]. It is not deliberately planned as a form of learning and may occur incidentally or unintentionally during everyday activities [7]. There are no formal tests or grades; learning is recognised informally through practice, contribution, or demonstration [8]. Learners have the freedom to choose their learning approaches. In other words, they control what, how, when, and why they learn, often driven by personal needs, curiosity, or a desire to solve problems [9]. This learner-controlled approach bridges informal learning and self-directed learning, promoting autonomy in exploring topics, curating information, and engaging selectively [10–12].

In their situated cognition theory, Brown *et al*. [13] and Lave and Wenger [14] considered informal learning to be embedded in real-world situations, experiences, or tasks; context is essential. This type of learning can impact economic, professional, and educational domains, enhancing individuals' working environments [15]. Informal learning within an organisation can improve skills and knowledge, enabling individuals to tackle various life challenges. An example of a less formal learning process might be an after-school meeting with a teacher for extra help or an employee watching an online video tutorial for work-related purposes [16]. In both instances, learning occurred 'outside' the formal education period, and the formal process of teacher-to-student knowledge transfer was less prominent. The informal learning process through doing, reflecting, and applying via blogs, YouTube tutorials, DIY content, etc., involves active experimentation and reflection, supporting the essence of experiential learning by Kolb [17, 18].

On a parallel note, web technologies and new learning

doi: 10.18178/ijiet.2025.15.10.2417

environments have also proven that learning can extend beyond classroom walls, in fact, to any environment. This ubiquity has ultimately led to changes in the materials used for teaching purposes [19], such as the widely used infographics [20] and videos for digital content development, which are aligned with current technology and communication trends. The term "Infographic" was popularised by Peter Sullivan in the 1970s and continued for three decades in the Sunday Times newspaper to advocate for visual data representations [21]. This concept gained further traction in the 2000s with the advent of Adobe Flash animation, which was used for various games and products on the Internet [22]. An infographic visually conveys information, knowledge, or data through graphics, presenting complex and detailed content to allow viewers to quickly and easily understand and interpret it [23]. Depending on the viewers, an infographic may serve various purposes, such as data visualisation, information design, or planning [24, 25].

This study defines informal e-learning on social media as unstructured, incidental, and self-directed learning that occurs through user interactions with digital content, specifically infographic posters and short videos shared by a Malaysian zakat institution on its official Facebook page. Zakat (zakat, zakah), or almsgiving, is one of the five pillars of Islam; therefore, it is obligatory for all adult Muslims who possess wealth above a specific threshold, known as the niqab, to pay 2.5% of that wealth as Zakat. Notably, understanding Zakat is essential for Non-Muslims to gain insights into Islam, as well as the spiritual, social, and material benefits for Muslims, and to fulfil one's obligations as a Muslim under Islamic law.

The digital materials aim to raise public awareness and understanding of zakat-related responsibilities, financial empowerment, religious observances, and Islamic social justice. Although not part of any formal instructional system, such digital resources contribute to knowledge dissemination by encouraging engagement through comments, reactions, and shares. Hence, the study is guided by the following research objectives:

1) To identify the level of engagement, i.e., views and shares of Lembaga Zakat Negeri Kedah (LZNK) (a state-level Zakat institution) digital content on its Facebook page to assess the reach of informal learning about Zakat.
2) To explore netizens' sentiments regarding the posted digital content as informal learning engagements and public understanding of Zakat.

The investigation focuses on the official Facebook pages of a Zakat organisation, analysing public interactions with religious digital content (infographics and videos) over one week. Emphasis is placed on understanding how such content promotes informal learning among netizens, as reflected in their viewing patterns and emotional engagement, as evidenced by comments and reactions.

Sentiment analysis is used to assess informal e-learning outcomes by examining user comments and reaction emojis on Facebook, such as "like," "love," "care," "haha," "wow," "sad," and "angry" in response to the developed religious content. These reactions reflect how audiences perceive and internalise the material, with positive emojis suggesting understanding and acceptance, while negative ones may indicate confusion or resistance. This data-driven approach provides insight into how social media content from zakat institutions supports informal learning in a digital religious and financial context.

II. Literature Review

As discussed earlier, informal learning is mainly learner-centred, non-institutional, and unstructured. It often happens in social media settings and is not formally evaluated or tested, as summarised in Table 1.

These criteria help distinguish informal learning from formal and non-formal learning and are featured in several well-known learning theories. The study grounds informal learning in several identified theories, i.e., connectivism, social constructivism, and situated learning, highlighting how learners naturally engage in self-directed, socially mediated learning experiences through digital networks and communities.

Connectivism, as proposed by Siemens [26], emphasises how technology enables networked learning and knowledge distribution through specialised nodes (people, databases, tools) and their connections across human and non-human systems. The theory posits that learning resides in the diversity of opinions across networks, where the capacity to acquire more knowledge and the need for up-to-date, accurate information drive the learning goals due to the rapid evolution of information. Similarly, Vygotsky's social constructivism emphasises the role of social interaction and peer collaboration in informal learning [27]. Informal learning on forums, comments, or social platforms often involves learners co-constructing knowledge.

Situated Learning and Communities of Practice, introduced by Lave and Wenger, also provide a crucial foundation for informal learning. The theory posits that learning is a social process through participation in authentic, real-world contexts. Communities of Practice, a central concept within the theory, involve people who share a common topic and deepen their understanding through frequent interaction. This approach renders long-term informal learning strategically relevant for learners, enabling them to enhance their knowledge and continuously improve their performance [28]. Emphasising that knowledge is best acquired in context, learning occurs through a process termed 'legitimate peripheral participation,' where learners engage in a community and gradually move toward full participation [29]. It emphasises individual accountability for learning, a primary characteristic of informal education in most cases, which often occurs within partnerships, communities, and workplaces [30]. Informal learning in online communities, hobby groups, or niche forums enables learners to participate in meaningful community-based learning, replicating real-world practices and fostering active participation within a community.

Another theory associated with informal learning is Self-Directed Learning. It becomes self-directed when individuals seek experiences and experiment based on their interests [31]. This theory aligns with informal learning, which is shaped by context, interests, and social interaction, and occurs through conversations, observations, or daily problem-solving [32]. Both approaches emphasise learner autonomy [33]. In Kolb's cycle, learners select experiences to guide their reflection and experimentation, mirroring the self-initiated nature of

informal learning [34]. The model emphasises the importance of learning from experience, which is particularly relevant for informal learning through unstructured activities rather than formal instruction.

Both self-directed and informal learning involve reflecting on experiences and adjusting understanding without external guidance. Informal learning often stems from personal interest, such as self-directed learners seeking meaningful knowledge [35]. Both types of learning adapt to fit learners' environments and personal goals. They emphasise autonomy, experience, reflection, and adaptation. These approaches empower learners to take control of their development, often outside traditional educational settings, making learning a lifelong, flexible, and meaningful activity.

Additionally, there are other frameworks for social media engagement in learning, like Affinity Spaces [36], Networked Learning theory [37], and Social Presence theory [38]. Modern affinity spaces are online environments where people discover shared interests (e.g., gaming, fan fiction, coding, activism) through platforms like Reddit, Discord, or X (formerly Twitter). Goodyear *et al*. [37] emphasise learning through digital connections between learners, content, and tools that suit informal, web-based learning using social media, blogs, podcasts, etc. Social Presence theory focuses on the degree of personal connection in online interactions [39]. Informal learning often succeeds when learners feel emotionally or socially connected to the material. These theories are tied to widely accepted characteristics or criteria.

Table 1. Informal learning criteria

Criterion	Description	Key Sources
Non-Institutional	Occurs outside formal systems; no accreditation	Livingstone (2001) [6]
Unstructured	Not planned or intentional; happens naturally in context	Eraut (2000) [7]
Self-Directed	Learner controls content, pace, and purpose	Knowles (1975) and Candy (1991) [9, 10]
Contextual	Embedded in real-world practices or authentic tasks	Lave & Wenger (1991) and Brown *et al.* (1989) [13, 14]
Socially Mediated	Peer collaboration, dialogue, and digital community interaction	Vygotsky (1978) and Gee (2005) [27, 36]
No Formal Assessment	No tests or grades; knowledge shown through action	Eraut (2004) [8]

This study defines videos as a medium for multimedia production, incorporating images such as pictures and graphics, as well as audio, typically including spoken words or background sounds [40, 41]. The key aspect of informative video excerpts is their substantial wealth of information, which enhances learners' motivation and promotes active learning [42, 43]. Infographics serve as a visual representation of data, organised and presented in a structured manner that conveys or enhances a narrative through visual elements [44]. They are widely used in the modern digital landscape, particularly on social media, where they appear as static images or simple web interfaces covering a range of topics. Infographics are a powerful visual storytelling tool in advertising and education [45, 46].

Both media offer a way to improve visual literacy skills, serving as a common visual approach for conveying abstract, complex, and concise messages [47, 48]. Research has shown that these social media tools boost visual literacy skills, student engagement, interaction, and peer communication [49]. Visual literacy encompasses multiple perspectives, including interpreting and learning through images, understanding meaning from visual messages, and utilising images in communication [50–52]. It is seen as a skill for understanding and interpreting actions, objects, and situations in the environment [53].

The visual nature of infographics and videos makes them highly shareable and memorable, increasing the likelihood of viral spread. A good infographic visualises a story, process, or idea, clarifies complicated information, and features an eye-catching design. It serves as a visual communication tool in human social life [54, 55], encompassing objects displayed on road signs, maps, education, and technical writing [56].

Similar notions are hypothesised to influence informal learning, where infographics and videos enhance the interpretation of information, concepts, or ideas, improve the capacity to think critically about complex data and augment information recall and retention [57]. Infographics and videos possess features that can promote more transparent and engaging information through visual presentation. When thoughtfully designed with a clear purpose, these tools can effectively persuade, guide, and mobilise audiences [58].

Numerous studies have found that incorporating infographics and videography into digital content enhances students' knowledge and understanding. Digital content that consists of infographics has been shown to improve language skills [59], music skills [60], nursing training [61], and business skills [62]. The content has the potential to help users enhance knowledge through informal e-learning. Additionally, the digital content's interactive and multimedia elements have enhanced user engagement and retention [63], making it more effective for communicating ideas and information than static printed materials. Such content can be shared instantaneously across various social media platforms and online channels, reaching a global audience with unprecedented speed and efficiency [64, 65].

Furthermore, infographics and videos in digital content possess distinct and unique identities. The graphics present an optimal amount of information and are visually appealing due to their colour combinations, adhering to instructional design principles [66]. They provide a straightforward, engaging design [67] that is easy to see, understand, and share with the public, regardless of boundaries. Presenting information through digital content, such as infographics and videos, is more straightforward because, according to research findings, the human brain can process visual data 60,000 times faster than text [68]. These characteristics make infographics and videos in online digital content more viral and widely distributed than printed materials.

The two media simplify complex and lengthy information into a more easily understandable form, proving effective mechanisms for knowledge transfer in educational settings and social media [69]. Digital content featuring infographics and videos is gaining popularity due to its eye-catching, succinct, and readable presentation, as well as its informative nature and persuasive elements [70]. Additionally, with the rise of internet-based applications, daily activities and feeds

through channels such as social media platforms and blogs, along with comments and shares, have emerged as informal learning forms that may be more effective than formal education. Aspects of information and persuasion are applied in the media to instil confidence in readers and encourage them to perform good deeds, such as fostering a positive attitude toward oneself and helping others. In return, their engagement, shaped by their preferences regarding the approach and content, contributes to personalising digital content and delivery, enhancing their interaction with online learning materials [71, 72].

However, empirical evidence of netizens engaging with infographics and videos to informally learn about topics like Zakat is uncommon. Developers should know whether creating knowledge and digital content about Zakat can reach the intended audience and satisfy needs beyond traditional educational contexts. Therefore, this study utilises sentiment analysis to gather viewpoints, discussions, and impressions on topics, products, roles, and services [73] related to Zakat, which has been developed and posted in digital content.

According to social constructivist theories, emotional responses play a vital role in mediating learners' engagement with content. From a connectivism perspective, learning happens through the creation and navigation of information networks. In this context, emotional engagement (measured via sentiment analysis) indicates successful knowledge absorption and reinforces learning connections.

Sentiment Analysis (SA), also known as Opinion Mining (OM), is a computational technique used to assess people's opinions, attitudes, and emotions regarding specific topics [74]. While the terms are often used interchangeably, OM usually focuses on extracting opinions about particular entities, whereas SA broadens to identifying and analysing the overall sentiment expressed in a text [75]. This sentiment is often categorised as positive, negative, or neutral, capturing subjective viewpoints for further analysis [76, 77].

SA employs natural language processing and text mining techniques to detect and extract personal and abstract insights from textual data [78]. These insights enable developers, institutions, and individuals to make informed decisions by revealing sentiment polarity, user motivations, and trends [79]. The increasing availability of unstructured social media data has driven demand for SA, especially in contexts where traditional assessment methods are impractical [80]. SA offers a theoretically grounded and scalable approach to evaluating user satisfaction and informal learning outcomes in education. Studies have demonstrated its value in digital learning environments, particularly for assessing the effectiveness of educational content based on learners' emotional engagement [81].

III. Methodology

A. Research Design

This study employs Type 1 design and development research (DDR) for evaluating digital content products for Lembaga Zakat Negeri Kedah (LZNK), the Kedah state Zakat institution. DDR is a systematic design, development, and evaluation approach that forms an empirical basis for material construction [82]. This type is commonly used to evaluate research techniques and assess the effectiveness of a product or technique developed during the design and development process stage.

B. Sampling Technique

Based on the earlier phase of the study's results, 18 digital content materials (11 infographics and seven videos) were created and posted on LZNK's FB page. These 18 digital contents were then evaluated according to viewers' views, shares, and comments. The religious digital content covers eight of LZNK's financial assistance schemes: community development, education, business, medical, housing, administrative management, *wakalah* (agent) for Zakat distribution, and contemporary issues. Table 2 shows the number of digital materials (infographics and videos) produced for each financial assistance scheme.

Table 2. LZNK financial assistance scheme's digital content on the FB page for evaluation

LZNK Financial Assistance Scheme	Number of (N)	
	Infographic	**Video**
1. Community Development	1	1
2. Education	-	1
3. Business	-	1
4. Medical	1	-
5. Housing	1	1
6. Administrative Management	3	-
7. *Wakalah* (Agent) for Zakat Distribution	1	-
8. Contemporary Issues	4	3
Total	**11**	**7**

A minimum interaction threshold was established to ensure that the digital content selected for analysis had sufficient visibility and engagement for accurate sentiment evaluation. This method aligns with standard practices in social media research, where engagement metrics, such as likes, comments, and shares, serve as filters for relevance and visibility. Ahmed et al. [81] note that researchers frequently employ thresholds, such as the number of likes, retweets, or comments, to assess the relevance and visibility of tweets.

Similarly, Luo *et al.* [83] argue that filtering by engagement helps include only messages with 'social traction,' thereby enhancing analytical relevance. Studies by Tarifa-Rodriguez *et al.* [84] emphasise that post popularity (likes, shares, comments) is often used to prioritise which content is selected for analysis, as it reflects learner engagement and perceived value. These practices support the use of engagement thresholds in this study, focusing on Facebook posts that effectively serve as informal e-learning content. Hence, to ensure the samples' representativeness:

- Only content containing informational or instructional value was selected.
- Duplicate, irrelevant, and spam comments were removed during the data cleaning process.
- The final dataset comprised 15669 views, 170 shares, and 723 comments, forming a robust foundation for sentiment analysis and engagement tracking.

C. Data Validity and Platform Relevance

The digital content is uploaded to the Global *Asnaf* Facebook page, which channels information on Lembaga Zakat Negeri Kedah's (LZNK) efforts and initiatives aimed at helping the community eradicate poverty in Kedah. Therefore, the target users in this study are netizens, primarily aged 25 to 34, as they constitute the largest demographic of

social media users across various platforms, including Facebook, Instagram, X, and YouTube. The Global Asnaf Facebook page can be accessed at https://www.facebook.com/globalasnafcare/ (Fig. 1).

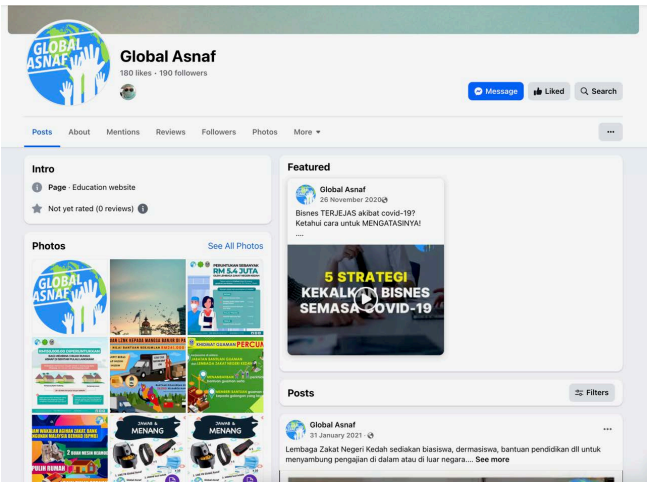

Fig. 1. Global Asnaf Facebook page.

Facebook was selected as the primary platform because of its widespread use in Malaysia. The platform's features allow various types of interaction, including views, comments, reactions, and shares, which are essential for measuring user engagement and informal learning. Figs. 2 and 3 show examples of LZNK digital content available through the Global Asnaf Facebook page.

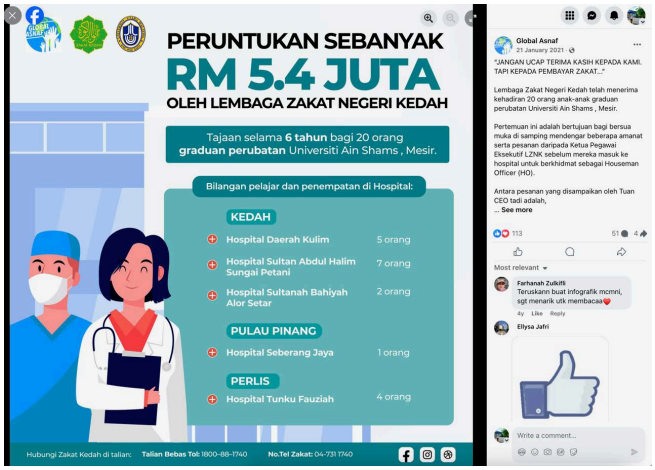

Fig. 2. A sample infographic at Global Asnaf FB illustrating one of LZNK's schemes.

The data validity was ensured by using only content from verified and official LZNK Facebook pages that were included. Posts were chosen based on their clear educational purpose, such as explaining zakat processes, detailing assistance programmes (e.g., housing, education, business), and promoting understanding of Islamic practices like *Qurban, Aqiqah,* and *Hajj*. Only content that was publicly accessible was considered, and comments from non-verified or irrelevant accounts were excluded.

One week was sufficient for collecting data on views, comments, and shares of Facebook content to evaluate informal learning. Studies show that most Facebook engagement occurs rapidly, with up to 75% of interactions happening within the first three hours [85] and significant activity tapering off after 24 hours [86]. A seven-day window allows for capturing both immediate and delayed responses, providing a reliable snapshot of user engagement relevant to informal learning analysis.

Fig. 3. A sample video on the Global *Asnaf* FB page explaining one of LZNK's schemes.

D. Sentiment Analysis

Digital content media combines text, graphics, audio, and visuals to effectively communicate both qualitative and quantitative information [53]. It further integrates the data to improve viewers' understanding of complex processes [44]. Therefore, this study uses SA to examine views, identify expressed feelings, and determine their polarity [74].

Sentiment analysis can be approached in three primary ways: lexicon-based, machine learning, and hybrid [52]. The lexicon-based method is effective for sentiment analysis at both the sentence and feature levels. It does not require training data and is therefore classified as an unsupervised technique [52]. Notably, caution must be exercised when assigning domain and sentiment polarity to words. This lexicon-based approach is analysed through a corpus, where frequencies are used to identify the viewpoints or co-occurrence patterns [52] from netizens who visited the Facebook page and viewed the digital content. The SA in this study was modified from Ekman and Friesen's model [87], which classified a person's emotions non-verbally as like, angry, sad, and shocked.

A lexicon-based sentiment analysis method was employed to categorise netizens' comments and reactions as positive, neutral, or negative. This approach utilises predefined sentiment dictionaries, allowing for a rule-based interpretation of emotional tone within short user-generated texts. It is suitable for social media contexts where posts and comments are typically brief and informal.

Alongside textual sentiment, the study examines Facebook reaction emojis as non-verbal indicators of sentiment. Emojis are expressions SA uses to convey emotions or, in this study, sentiment. Emojis help describe a person's tone when composing a sentence and assist in sentiment analysis [52]. They replace straightforward meanings with opinions that express a range of reactions, including agreement, happiness, dissatisfaction, annoyance, or resentment.

Since Facebook's (FB) functionality is limited to a few emotions, only the available features are used to assess whether it functions effectively as an informal e-learning platform. The uploaded digital content, including

infographics and videos, is evaluated based on the sentiment expressed through user actions such as "like", "love", "care", "share", and "comments" (Fig. 4) by netizens, which are regarded as their feedback on the uploaded infographics and videos [88]. As shown in Fig. 4, these reactions are classified as positive, negative, or neutral sentiment [89].

Fig. 4. The study's sentiment categories for the Facebook emojis.

The emojis used by netizens were analysed and recorded to gather their feedback on the digital content produced. Two researchers also reviewed each netizen's feedback to ensure the overall sentiment rate could be calculated accurately for each uploaded material. The combination of comment-based sentiment tagging and emoji analysis provides a broader and more accurate picture of public response, particularly regarding the processing and internalisation of educational messages in a digital environment.

IV. Result and Discussion

This study posits that when the LZNK's digital contents are uploaded, posted, viewed, commented on, and shared, a form of informal e-learning occurs. Table 3 demonstrates that all eight topics on LZNK assistance schemes' infographics and videos created for informal learning have attracted the attention of netizens due to the significant number of views.

Table 3. The frequency of 'views' for LZNK financial assistance schemes' digital content on the FB page

LZNK Financial Assistance Scheme	View (*f*)	
	Infographic	**Video**
1. Community Development	265	5700
2. Business	-	4000
3. Education	-	132
4. Medical	244	-
5. Housing	220	142
6. Administrative Management:		-
• Legal Services	287	-
• MoU	88	-
• Operations	272	-
7. *Wakalah* Zakat Distribution	324	-
8. Contemporary Issues:		
• *Qurban* & *Aqiqah* (Sacrificial Meat)	73	171
• Tightened Movement Control Order (TEMCO) Aids	110	-
• Flood Relief Mission	450	-
• Annual Events (*Hajj*, circumcision, etc.)	306	2885
Total Views	**2639**	**13030**

The results highlight the advantage of videos, which collected more views than infographics, particularly the Community Development (5700) and Business Assistance videos. Although there were fewer videos than infographics, the total views of the former were 13030, in contrast to the latter, which had 2639 views. The significant gap in opinions between the two forms of media shows that information in videos, which integrates multimedia, is 'catchier' to netizens when played directly on mobile devices or computer screens.

Moreover, although infographics have more 'shares' (89) than the videos (81), the amount is not commensurate with the number of developed infographics (11) that covered more LZNK schemes than the seven videos. The videos on community development (20) and business assistance (17) have the highest shares. Table 4 presents the number of FB Shares for infographics and videos of LZNK's digital content.

Table 4. The frequency of 'shares' for LZNK financial assistance schemes' digital content on the FB page

LZNK Financial Assistance Scheme	Share (f)	
	Infographic	**Video**
1. Community Development	2	20
2. Business	-	17
3. Education	-	6
4. Medical	9	-
5. Housing	3	9
6. Administrative Management:		
• Legal Services	7	-
• MoU	6	-
• Operations	12	-
7. *Wakalah* Zakat Distribution	7	-
8. Contemporary Issues:		
• *Qurban* & *Aqiqah*	10	7
• TEMCO Aids	8	-
• Flood Relief Mission	11	-
• Annual Events	14	22
Total Shares	**89**	**81**

The sentiments in Tables 3 and 4 indicate that netizens prefer video graphics. The three videos with the highest views compared to others are Community Development (5,700), Business Assistance (4,000), and Annual Events (2,700). Meanwhile, videos on Education, Housing, Qurban (Islamic sacrifice), and the Hajj Ritual received fewer than 200 views. On the other hand, no specific polarity was identified based on the topics of LZNK schemes that include both graphics and text. The Community Development video has more views (5700) than its infographic version (265), while the Housing Assistance video was shared three times more than its infographics.

Table 5. The frequency of 'comments' for LZNK financial assistance schemes' digital content on the FB page

LZNK Financial Assistance Scheme	Comment (f)	
	Infographic	**Video**
1. Community Development	0	41
2. Business	-	36
3. Education	-	34
4. Medical	32	-
5. Housing	51	27
6. Administrative Management:		
• Legal Services	97	-
• MoU	25	-
• Operations	27	-
7. *Wakalah* Zakat Distribution	99	-
8. Contemporary Issues:		
• *Qurban* & *Aqiqah*	20	25
• TEMCO Aids	30	-
• Flood Relief Mission	108	-
• Annual Events	29	42
Total Shares	**518**	**205**

The qualitative comments for each graphic were counted

to support the views and shares of the LZNK digital content. The total number of comments can be considered a measure of netizens' further engagement and interest. The comments indicate the time netizens spent viewing, learning from the materials, and engaging with the content. The infographics received more comments (518) compared to the videos (205), with "Flood Relief Mission" (108) and *"Wakalah* Zakat Distribution" (99) being the top two on the list. On the other hand, the seven videos have an average of 30 comments each, except for the Community Development Assistance video, which garnered the most comments (42). Table 5 shows the number of comments for LZNK infographics and videos.

Furthermore, the SA was quantitatively analysed using FB emojis. The netizens' sentiment towards the infographic produced was mainly 'like' and 'love'. Fig. 5 presents the netizens' sentiment analysis evaluation of the 11 LZNK infographics.

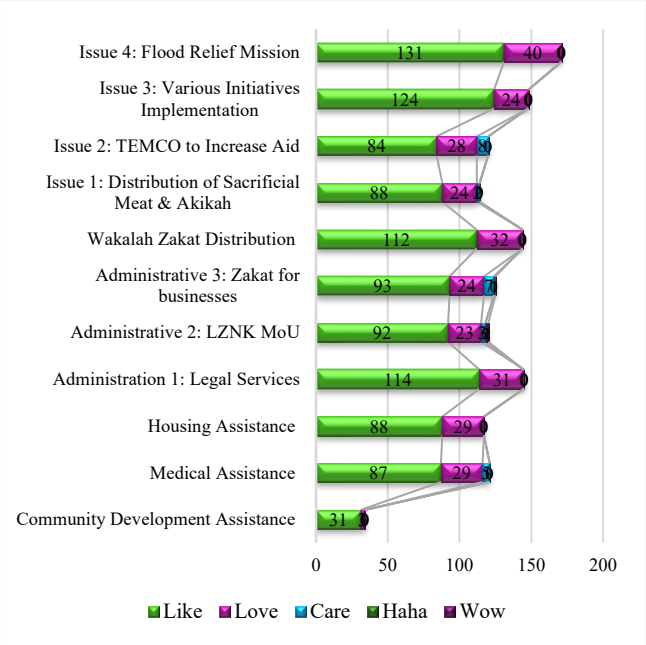

Fig. 5. LZNK's infographics sentiment analysis evaluation by the netizens.

There are small numbers of 'care' emojis for TEMCO Aids (8), LZNK's operations (7), Medical (5), LZNK MoU (3), and Sacrificial Meat and *Aqiqah* (2). Additionally, there are three 'wow' emojis from LZNK MoU (2) and Operations (1). The infographic of the Flood Relief Mission received the most 'likes' (131) and 'loves' (40).

Similarly, Fig. 6 illustrates the significant number of 'like' and 'love' emojis for the developed videos compared to others. The Business Assistance scheme received the highest 'like' (180) and 'love' (79). Two 'haha' were gathered from Community Development Assistance and Qurban and *Aqiqah*, and three 'wows' were gathered for each Community Development and Business. No 'care', 'sad', or 'angry' emojis were rated for all the videos.

In the one-week survey, the LZNK digital content on the FB page gained significant attention from netizens visiting the page. The high number of views, comments, and shares indicates that the digital content achieved its objective of educating netizens about LZNK's schemes for eradicating poverty, particularly in Kedah state. The sentiment analysis results from the gathered emojis indicated netizens' engagement with the content, proving that informal e-learning occurred among those who visited the Facebook page. Infographics and videos distinguish themselves from other visualisation methods by effectively aiding comprehension and learning, particularly for dense and complex subjects [53]. Infographics concisely convey complex information, facilitating cognitive processing, understanding, and future recognition and recall [23]. The digital content's interactive features and multimedia elements improve netizens' user engagement and retention, making it more effective for conveying ideas and information than static content materials.

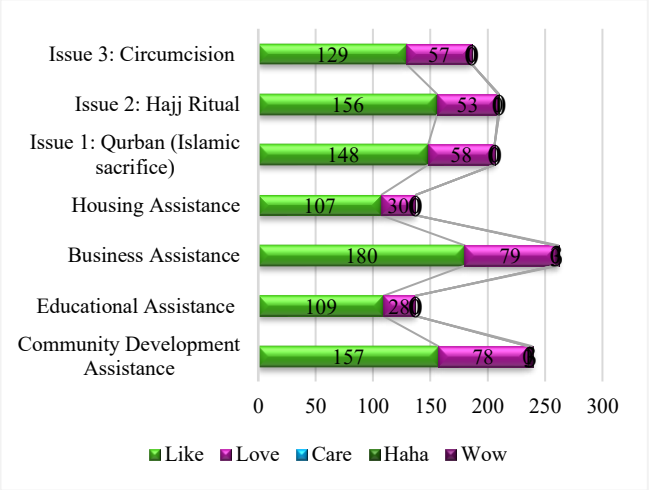

Fig. 6. LZNK's video sentiment analysis evaluation by the netizens.

Moreover, the digital content about LZNK's financial schemes enhances netizens' knowledge that is relevant to their needs. It is accessible whenever they want to learn more, maintaining a relaxed and independent experience in a natural environment. Self-directed learning becomes evident when netizens visit the Facebook page, triggering their interest and facilitating learning through likes, shares, and comments on the developed digital content [48]. This informal learning is unstructured and fully controlled by netizens, allowing them to determine their learning patterns regarding when and how to engage, as their preferences influence their engagement with digital content [71].

The findings also depict that netizens use emojis to express their sentiments towards the digital content created for LZNK's schemes. The combined number of likes, loves, cares, and wows showed high positive ratings for all the digital content, particularly the videos. The reactions of netizens to liking, sharing, or commenting on social media signal positively that the information and knowledge in the content have reached LZNK's targets more effectively than a physical meeting could. Within a week, the information in the video and infographics was viewed and shared directly with netizens' technological devices, broadening audience coverage. Additionally, it was noted that netizens prefer digitally integrated multimedia content for understanding complex Islamic concepts related to Zakat, as the content is chunked into more readily understandable segments [67].

The nature of engagement also reflects the principles of connectivism, where learning occurs across networks and through digital interactions, rather than solely in formal settings [26]. Netizens' autonomous decisions to like, comment, and share content illustrate networked learning

practices, emphasising collaboration, openness, and the building of informal learning communities. These actions create a space where individuals with a shared interest in religious obligations and social welfare gather, interact, and co-construct understanding, even without direct instructional facilitation.

Furthermore, integrating infographics and videos made complex religious content more accessible. Zakat-related knowledge can be best acquired in authentic, socially situated contexts. The Facebook page was a digital environment that contextualised zakat schemes within everyday life challenges, making the learning process relevant and meaningful for the participants.

The findings contribute to educational technology and digital learning by offering empirical evidence that social media platforms can act as powerful environments for self-directed [34], networked [37], and socially mediated informal learning. For educators, this study highlights the importance of designing digital learning experiences that foster emotional engagement, social presence, and community interaction. For policymakers, the success of LZNK's digital campaign demonstrates that leveraging social networks and analysing public sentiment can significantly enhance the reach and impact of educational initiatives. For content creators, the findings underscore the importance of developing content that provides information and fosters affinity spaces and emotional connections to sustain user engagement and support informal learning.

Critically, these patterns reveal distinct modes of engagement associated with content format. The higher view counts for videos suggest that video content encourages broad, passive exposure, likely because of its ease of consumption on mobile devices and social platforms. In contrast, the larger volume of comments on infographics indicates that static visuals may foster deeper cognitive engagement, prompting users to pause, reflect, and respond. This distinction aligns with self-directed learning theory [10], where learners independently determine their mode and depth of interaction with educational resources based on personal motivation and cognitive readiness.

The consistently positive sentiment emphasises the importance of social presence [38] in digital learning environments, where emotional resonance and perceived connectedness promote informal learning. Within affinity spaces [36] and networked learning frameworks [37], the content fosters a shared sense of purpose around zakat-related education, creating conditions suitable for community-driven knowledge building without formal instructional structures. The absence of negative sentiment can also be understood through situated learning [14], where cultural and religious norms shape communication behaviours, encouraging respectful and positive participation in public forums discussing sensitive topics, such as Islamic charity obligations.

However, the limited use of 'wow' reactions indicates that while the content was emotionally validating, it may not have consistently triggered significant surprise, critical reflection, or heightened cognitive arousal. Future digital content strategies could explore incorporating more interactive, novel, or thought-provoking elements to further strengthen engagement.

Topic-level differences also became evident, with videos related to community development and business assistance attracting significantly more views and shares than those focused on education or religious rituals. This pattern highlights that the content's relevance to immediate socio-economic concerns increases informal learning engagement, emphasising the need for content curation strategies that are sensitive to audience priorities.

The findings revealed that sentiment analysis of social media interactions offers valuable insights into learner engagement, emotional connection, and informal knowledge building. Educators should use social media in digital learning to create flexible, multimedia-rich resources that support both passive and active engagement. For policymakers, the results suggest that social media initiatives can reach a broad audience when they are culturally relevant and emotionally engaging. Finally, content creators should focus on balancing emotional appeal, cognitive challenge, and topic relevance to optimise informal learning outcomes through digital platforms.

In conclusion, the LZNK religious digital content posted on Facebook attracted significant engagement from netizens, achieving 15,669 views, 170 shares, and 723 comments within one week. Videos significantly outperformed infographics in terms of views, attracting 13,030 views compared to 2,639 for infographics, despite having fewer video posts. However, infographics generated more comments (518) than videos (205), indicating different engagement patterns between media types. Sentiment analysis revealed overwhelmingly positive reactions across all content, with few expressions of negative emotions detected.

V. Conclusion

The religious digital content created by LZNK and shared via its Facebook page effectively engaged netizens, fulfilling its goal of educating the public about zakat schemes through informal, self-directed learning. Sentiment analysis of Facebook emoji reactions revealed a predominantly positive emotional tone, particularly towards videos, suggesting a strong social presence and emotional connection with the content. These interactions align with social constructivist perspectives, where emotional engagement facilitates the creation of meaning within informal, community-based environments. User behaviour, such as likes, shares, and comments, demonstrated a preference for learning outside traditional settings, highlighting the influence of visual media in promoting knowledge transfer.

The success of LZNK's digitalisation initiative underscores the potential of social media as an effective informal learning platform. The study highlights the growing importance of visual literacy in enabling learners to interpret, evaluate, and create meaningful content. Therefore, infographic and video development training is recommended for content creators to sustain and enhance digital learning experiences. Given their popularity and interactivity, platforms like TikTok can be leveraged to expand reach and impact. These findings support the vision of Education 5.0, advocating for technology-enhanced, learner-centred education that responds to evolving societal and individual needs.

Nevertheless, several limitations should be acknowledged. First, the sentiment analysis was conducted using a basic manual approach, which might not have fully captured the complexity or nuance of emotional expressions in the data. Furthermore, sentiment analysis models are susceptible to inherent biases, exceptionally when trained on datasets that may not fully represent the linguistic and cultural features of the analysed website content. The absence of more advanced sentiment analysis tools also restricts the accuracy and depth of the results. Acknowledging these limitations, future research could benefit from improved sentiment analysis techniques such as AI-driven applications and larger datasets to strengthen analytical rigour. Lastly, the study's findings are specific to its context and may not be readily generalisable to broader informal learning environments.

Although this study utilised publicly available content from the official LZNK website, ethical concerns regarding privacy, data consent, and potential misinformation were considered. The researchers sought permission from the LNZK office, despite the data being publicly accessible. Additionally, efforts were made to anonymise any specific organisational details where appropriate to prevent misrepresentation. While the analysis focused on verifying the reliability of the information presented, the possibility of encountering misinformation cannot be entirely excluded. Future research should incorporate stricter data verification procedures when analysing online content to ensure responsible research practices.

Conflict of Interest

The authors state no conflict of interest.

Author Contributions

Aliff Nawi conceptualised the study, led the research design, and coordinated the overall project implementation. Nor Yazi Khamis contributed to the development of the research framework, conducted the literature review, and provided critical revisions to the manuscript. Azwin Arif Abdul Rahim was responsible for data collection, preliminary analysis, preparation of visual and tabular data, and proofreading. Wan Hilmi Wan Abdullah conducted in-depth data analysis, contributed to drafting and refining the manuscript, and provided support for research funding. All authors reviewed and approved the final version of the manuscript.

Acknowledgment

We gratefully acknowledge the financial support provided by the School of Education, Universiti Utara Malaysia, for funding this study (Reference Code: SO 21373), as well as the GGPM-2022-023 grant from Universiti Kebangsaan Malaysia (UKM). We also extend our sincere appreciation to the RIMC UUM for their invaluable support and assistance throughout this research.

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