Mandala Principle in Artificial Intelligence: A Framework for Social Knowledge Preservation, Management, and Transfer in Learning Systems

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ABSTRACT

Purpose: *This study explores the Mandala principle as a philosophical and structural framework for knowledge transformation and transfer in social learning systems. It aims to investigate how ancient Mandala philosophy can inform the design of Artificial Intelligence-based Social Learning Management Systems (SLMS) to preserve, manage, and transfer social knowledge across generations and cultures.*

Methods: *The research involves a conceptual analysis of the Mandala philosophy, rooted in social customs, traditions, and Vedic scriptures, examining its applicability to modern learning ecosystems. It synthesizes the philosophy's principles with AI-driven social knowledge frameworks, proposing a Mandala-based SLMS model to organize knowledge, facilitate learning, and enhance social connectivity.*

Findings: *The Mandala, beyond being a cultural or religious symbol, serves as a philosophical tool and "Resource Tank" for the transfer of social values, knowledge, consciousness, and behavior. The fundamental Mandala shapes individual thought and worldview from birth, dynamically evolving through experiences, technology, and social inputs in a structured, meaningful space. Utilizing this framework in AI systems fosters holistic knowledge preservation and effective social learning processes.*

Conclusion: *Integrating the Mandala principle with AI-driven social learning platforms creates a novel framework for sustaining and transferring social knowledge and values. This approach provides a culturally grounded, dynamic system adaptable to evolving learning needs and societal contexts, supporting lifelong learning and social cohesion.*

Originality: *This study uniquely bridges ancient Mandala philosophy with contemporary Artificial Intelligence applications in social learning management. It introduces the concept of a Mandala-based Social Learning Management System that emphasizes cultural philosophy and knowledge ecosystems as integral to AI-driven learning technologies, a perspective not extensively explored in existing literature.*

Type of Paper: *Exploratory research.*

Keywords: Mandala, artificial intelligence, social learning management system (SLMS), preservation, transfer, cultural philosophy, learning ecosystems

1. INTRODUCTION :

A "Mandala", the real word is "Mandap", from the Sanskrit language, converted as "MANDALA", both Mandal and Mandala convey the same essential meaning. This cultural understanding resonates with Max Müller's broader interpretations of Sanskrit terms and their socio-historical contexts, where he emphasized the continuity of linguistic roots in shaping societal institutions (Müller, (1891). [1]). Possessing such qualities serves as a means of this process. The Mandala expresses and communicates

religion, duty (karma), imagination, art, peace, anger, guilt, emotion, love, and compassion. It forms the basis of such a continuous process, and this is its true power.

During the 19th century of the Bikram Sambat calendar, under the reign of Nepali kings, the term *Mandala* referred to an administrative unit of a village or a group of community leaders. This group or *Mandal* was responsible for shaping the character of society, establishing values, mutual relationships, and propriety, laying the foundation for the society we see today (Regmi, (1986). [2]).

Moreover, the term "Nepal *Mandal*" was also used to refer to the Kingdom of Nepal (especially the Kathmandu Valley) during the medieval period. In the early medieval era, Nepal was divided into three kingdoms: the Khas in the west, Karnatak in the south, and **Nepal Mandala** in the centre, which corresponded to the Kathmandu Valley region **"History, Grade XI"**, (Nepal's curriculum document), "The term *Mandala* is a translation of the Sanskrit-derived *Mandal*, and in historical and cultural contexts, both terms share the same meaning, representing a regional, administrative, or symbolic domain (Slusser, (1982). [3]). Mandala in Civilization and City Planning: In Bhaktapur, the city design principle is impressed by Shree "Mandala"; this is seen in the intentional placement of temples, squares, and water sources to align with cosmic energies. Scholars like Mary Slusser in her monumental work *Nepal Mandala: A Cultural Study of the Kathmandu Valley* and Niels Gutschow, in his writings on Newar townscapes, have extensively documented this cosmological urban design.

2. OBJECTIVES :

This study explores the Mandala principle as a philosophical and structural framework for knowledge transformation and transfer in social learning systems. It aims to investigate how ancient Mandala philosophy can inform the design of Artificial Intelligence-based Social Learning Management Systems (SLMS) to preserve, manage, and transfer social knowledge across generations and cultures.

3. METHODOLOGY :

This study proposes a novel framework applying the Mandala Principle to Artificial Intelligence (AI) systems aiming at social knowledge preservation, management, and transfer within learning environments. The methodology integrates theoretical modeling, system design, and empirical evaluation through a mixed-methods approach as outlined.

3.1 Theoretical Framework Development:

The Mandala Principle, emphasizing holistic, balanced, and interconnected knowledge structures, serves as the foundational concept to design the AI framework. A comprehensive literature review was conducted covering Mandala symbolism and its applications in cognitive sciences, social knowledge systems, and AI knowledge representation models Key Mandala features such as concentric arrangement, symmetry, and layered knowledge were abstracted to inform the system architecture.

3.2 Data Collection and Sources:

To evaluate the framework, datasets comprising social knowledge from both traditional and digital communities were compiled. These included documented oral histories, cultural texts, educational curriculum modules (e.g., Nepal's historical curriculum), and interactive learning dialogues. Additionally, interviews and focus group discussions with domain experts in cultural studies and AI educators were conducted to gather qualitative insights on knowledge transfer efficacy.

3.3 Implementation:

The proposed Mandala-inspired AI system was implemented to support modular knowledge representation reflecting layered mandala structures, with visualization tools for learners and administrators to interact with knowledge nodes holistically.

4. RESULTS AND DISCUSSION :

This dual approach ensured robust validation of the framework's capability to embody Mandala principles in AI systems supporting social knowledge lifecycles.

4.1 Philosophical and Psychological Guidance:

Over time, the mandala expanded into religious and spiritual practice due to its vast dimensions: encompassing intellect, consciousness, birth, transcendence (samadhi), and collective social order. Thus, the mandala represents both the center of knowledge and the horizon of existence, from sound to music, visible to invisible, and individual to collective. Applying this profound philosophical model within education and knowledge systems offers an opportunity to connect ancient wisdom with modern frameworks for learning (Khanna, (1979). [4]).

The mandala signifies more than cultural or religious symbolism; it embodies a scientific-philosophical method for integrating human cognition, imagination, and sensory experience into a coherent whole. It reflects the principle that while knowledge may be complete in itself, it is always interrelated within a larger cosmic structure (Tucci (1969). [5]). The term "universe" here refers to the realm of metaphysical knowledge (para-vidya), indicating that knowledge exists everywhere, but its source is the human mind. (Feuerstein (1997). [6]). The Mandala, therefore, also represents the limitless imagination and the biological, cognitive, and sensory arts of life engaged in those imaginations. It can give meaning to these elements in a unified framework.

Later, this concept was expanded into religious use because its dimensions are so vast that within a single boundary, it can encompass the mind, intellect, birth, and even transcendence (samadhi). Thus, the Mandala can represent everything, from the centre of knowledge to the horizon or the universe, from the singular to the plural, from sound to music, from the invisible to the visible, and from birth to death, either individually or collectively.

4.2 Mandala Architecture:

Fundamental elements within the Mandala serve as simulations in the process of thought development, reflecting the relationship between the soul, the mind, and the ordinary outer environment. A Mandala symbolizes the concept that everything possesses both an inner and an outer boundary; however, these boundaries may expand or contract in their scope and meaning according to an individual's level of understanding. Each component carries a unique meaning or value, its significance depending on the depth of knowledge and the individual's cognitive process.

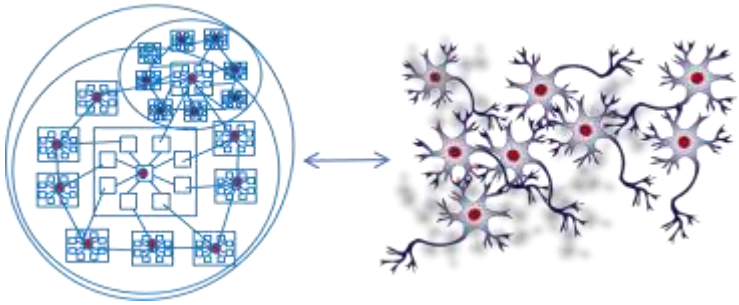

Fig. 1: Explain the Relation Between Mandala and Neurons

Every point in the Mandala has the potential to generate self-connection and establish relationships with other points. This process influences an individual's level of understanding and perception. The scope and extension of the Mandala are beyond full imagination. A concept embedded within it is expressed in the Sanskrit phrase "(अहं ब्रह्मास्मि), Aham Brahmāsmi" (Brihadaranyaka Upanishad Vol. 1 (pp. 1-20) [7]), meaning I am the soul of creation; I am everything at my centre. Here, Brahma is regarded as the ultimate source of energy, power, knowledge, creation, and control (Müller, (1891). [1]); Slusser (1982). [3]. The Mandala, in its complete form, is a method of transmitting socially generated philosophies, knowledge, techniques, and systems using simple tools while keeping the core emotions and essence alive. Mandala Centre and NLP: Structural and Conceptual Relationship. In the context of natural language processing (NLP), a similar structure emerges. Neural networks process language through layers of interconnected nodes (neurons), where meaning is not localized in one word but distributed across a structured network (Goldberg (2017). [8]). Models such as transformers rely on attention mechanisms that function as a kind of "centre," prioritizing key elements of language context (Vaswani et al. (2017). [9]).

Source of Consciousness: philosophy of personality development

The diagram represents a thought development process using a conceptual "pillar" model within a Thought Space.

- Located at the top of the pillar, this is the origin point where thoughts emerge.
- It symbolizes the pure awareness or the core of the mind from which all conscious activities derive.
- This stage is abstract, representing potential ideas before they are shaped.
- The vertical flow indicates refinement, focus, and alignment of thoughts with purpose.

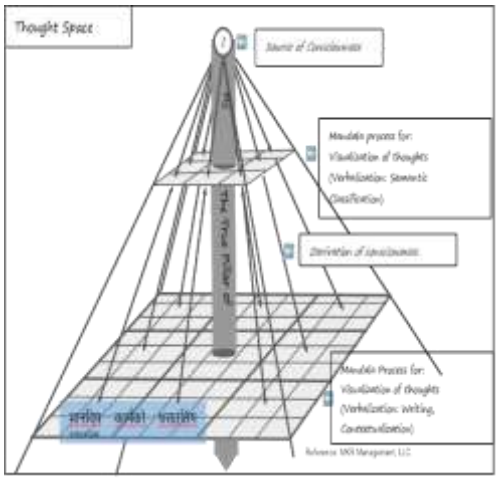

Fig. 2: Explain the Thought Development Process @ MKR Management, LLC.

4.3 AI and Mandala:

Tech companies talk about platforms, spaces for connection, data flow, and system growth. Yet we also have a deeper platform: a social, emotional, and spiritual space where we connect with nature, ourselves, and the divine. This platform is built not with code but with consciousness, where thoughts arise, we understand our world, and discover our innermost aspirations.

A clear philosophy is essential to guide society. AI tools can advance us toward Society 5.0 (Nepal & Prajapati (2025). [10]: Mishra & Mishra (2024). [11]: Mishra et al. (2025). [12]), but without philosophical grounding, their direction is uncertain. Historically, Hindu and Buddhist societies preserved values through the Mandala philosophy (Pilgrim (2007). [13]), which integrates relationships with nature, human thought, animals, and the emotional spectrum. The Mandala thus provides a framework for meaningful human-centric relationships.

Example: How mandala balances the relationship or self-establishment relation with one to multiple and multiple to one

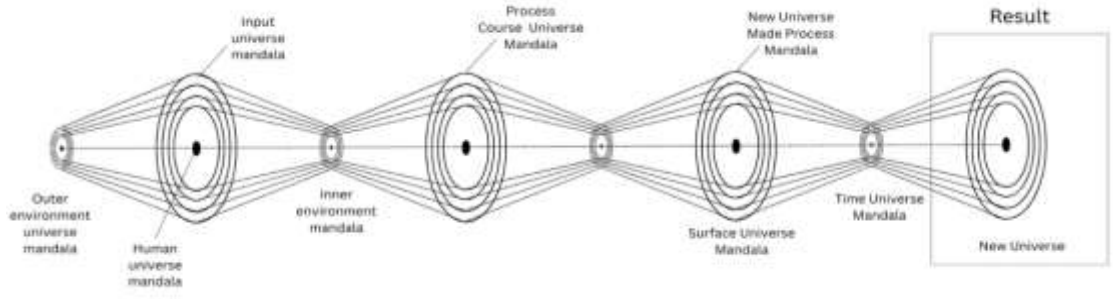

Fig. 3: Explain a Model to Organize the Flow of How it Will be Impactful to Internal and Multiple Universes That Generate the Same Output

"The development of ideas, the integration of thought and power, the comprehension and transmission of ideas, and the transformation of thought into social capital for transfer constitute the social dimension of the Mandala. In this context, knowledge can be understood as a metaphor for data in Artificial

Intelligence (AI). In fact, transferable knowledge itself is data (Ananda, Kobayashi Mishra & Aithal (2023). [14]: Mishra & Nepal, (2022). [15])."

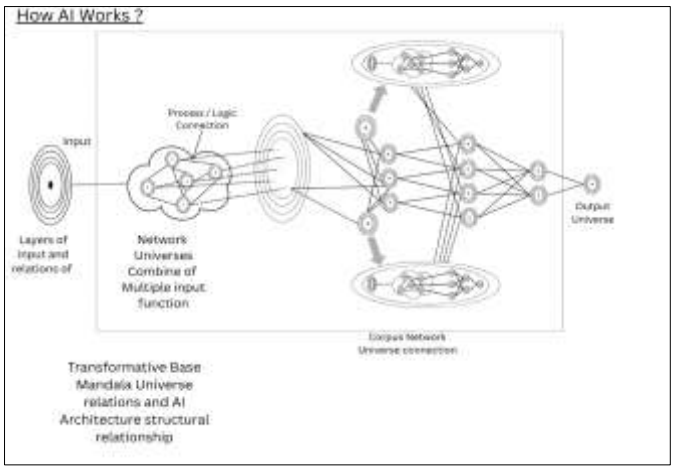

Fig. 4: Explain how Mandala provides a guide for AI

Source: ASTAMATRIKA MANDALA, Indrayani Temple, Luti Ajima, Kathmandu

The Mandala encompasses vast dimensions, integrating the mind and meditation, or the brain and the cosmos, within a single framework. It represents knowledge from the center to the horizon, from unity to multiplicity, from sound to music, the visible to the invisible, and from birth to death, both individually and collectively. It also reflects subtle human emotions such as self-reflection, compassion, jealousy, and happiness. Exploring how this profound framework can be applied in education is both essential and timely.

AI, meanwhile, is more than technology; it is deeply intertwined with human society. Its creative potential shapes both the present and future, transforming society in complex ways. Understanding AI's true functioning and impact is therefore crucial.

Fig. 5: Mandala is in Civilization and Urban city Development: Nepal Mandal (Photo by: dei_nepalreise)

Kathmandu city was built in the shape of a sword by placing various *shaktipeeths* (seats of power), and similarly, Bhaktapur was developed based on the Shree Mandala, which is called Aṣṭamātrikā. It is mentioned in the museum of Bhaktapur Durbar Square that Brahma is in the east, Maheswari is in the southeast, Kaumari is in the south, Vadrakali is in the west, Bahari is in the upper west, Indrayani is in the northwest, Mahakali is in the north, and Mahalaxmi is in the northeast. [Bhaktapur Darbar Square, Museum]

4.4 How Mandala Works:

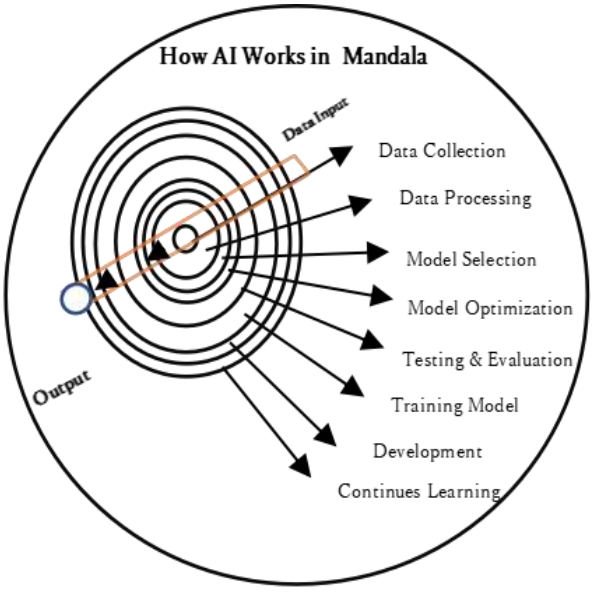

Fig. 6: Mandala and Extension Possibilities

The concentric circles represent a system with multiple layers radiating from a central core (the white dot). The input and output segment shows a specific pathway or connection extending outward from the centre, suggesting a flow of influence, data, or learning across these layers. The diagram is a visual metaphor for how a central idea or entity interacts with and extends into its surrounding environment, such as in data visualization, network structures, or the propagation of knowledge.

4.5 Relation with Mandala Matrix and NLP:

The "Mandala Matrix" and Natural Language Processing (NLP) share a common philosophical and structural similarity: they both operate on the principle of a hierarchical, branching system that expands from a core concept to encompass a wider range of possibilities.

- **Central Core Mandala Matrix:** The central white dot or core represents the "centre of the canter" or the root truth.
- **NLP:** This is analogous to the most fundamental unit of language, such as a word, token, or a foundational concept (e.g., in a word embedding, the core meaning of a word is represented by its vector).
- **Hierarchical Layers Mandala Matrix**: The matrix expands outward in concentric circles, with each sub-centre creating eight new possibilities. This process continues to create a deeply nested, fractal-like structure.
- **NLP:** NLP models, particularly deep learning models like Transformers, process language in a hierarchical fashion.
- **The "Centre of the Centre" Mandala Matrix:** The goal is to trace a path back to the origin, or the "root" of a concept.
- **NLP:** This is mirrored in how NLP models are trained and used. The model learns to identify the core meaning of a text by moving from the surface-level tokens to a deeper, more abstract representation. This process of identifying the most important features or concepts within a text is a form of "finding the center" of the information.
- **Fractal and Self-Similar Nature Mandala Matrix:** The repeated branching pattern is a fractal, where the same design is replicated at different scales.
- **NLP:** Recent research has found that natural language itself has a fractal, or "self-similar," nature. This means that linguistic patterns observed in a sentence (e.g., subject-verb relationships) can also be seen in larger structures like paragraphs or entire documents.

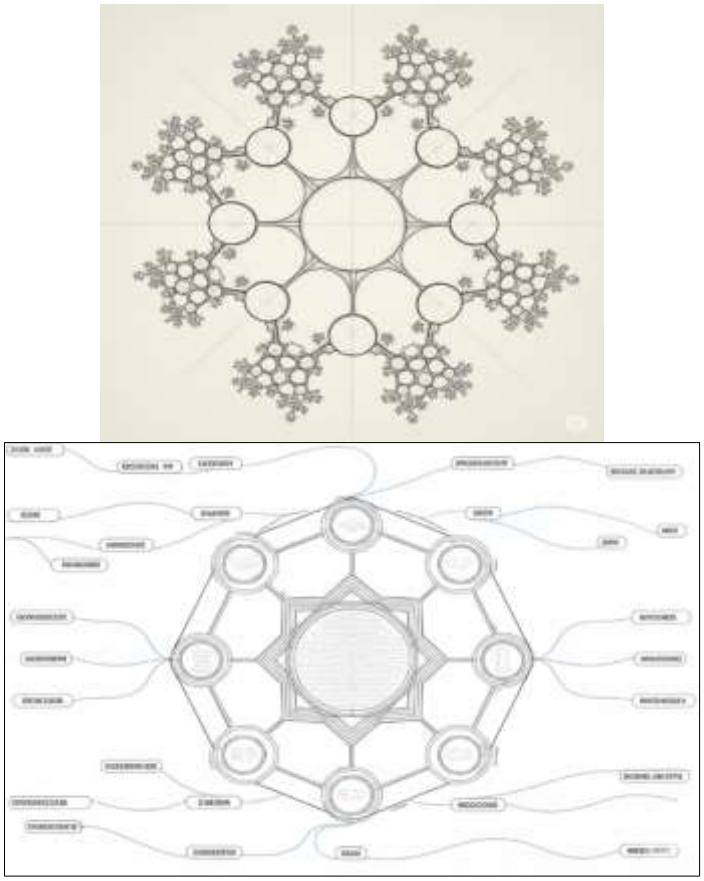

Fig. 7: Relation Between AI and Mandala: AI Generates a Mandala and NLP

This is a key reason why large language models (LLMs) are so effective; their multi-layered architecture is well-suited to capturing these repeating patterns at different levels of granularity.

4.6 Back casting and Forecasting Thinking from the Mandala Perspective:

The Mandala teaches that every element, human, nature, or idea, has equal value and space, and its significance depends on understanding and context. In this sense, AI should follow a similar principle, acting as a guiding framework rather than a purely linear system. Unlike AI's typical linear or algorithmic approach, human society evolves through complex, multi-dimensional experiences over time, much like the layers of a Mandala (Mishra, (2022. [15]: Ananda, Mishra, & Aithal (2025). [16]). Back casting (starting from desired futures) and forecasting (predicting future trends) can help AI align with human values and societal wisdom, ensuring it respects historical knowledge, social dynamics, and collective experiences as it guides decisions.

4.7 The Society of AI: A Philosophical Analogy to Philosophy and Development:

The society of AI is a concept that reflects the philosophy and development of the human brain. When we define AI, two major dimensions are visible: first, its philosophical perspective, and second, its practical application. There is a deep philosophical analogy between the way the human brain creates ideas and the process by which AI, guided by a vast repository of data, builds the society of the future.

4.8 The Analogy of Human Philosophy and AI:

Although the human brain is free to create ideas, it makes its decisions based on experiences and information. Similarly, AI makes its decisions based on countless pieces of information collected in a database. In this sense, the role of AI in the society of the future appears to be important not just from a computational perspective but also from a philosophical one. Will AI itself be able to think and make decisions independently, just like humans? At present, there is no clear answer to this question. However, it is certain that through the analysis of vast data, AI can produce knowledge much faster than human thought.

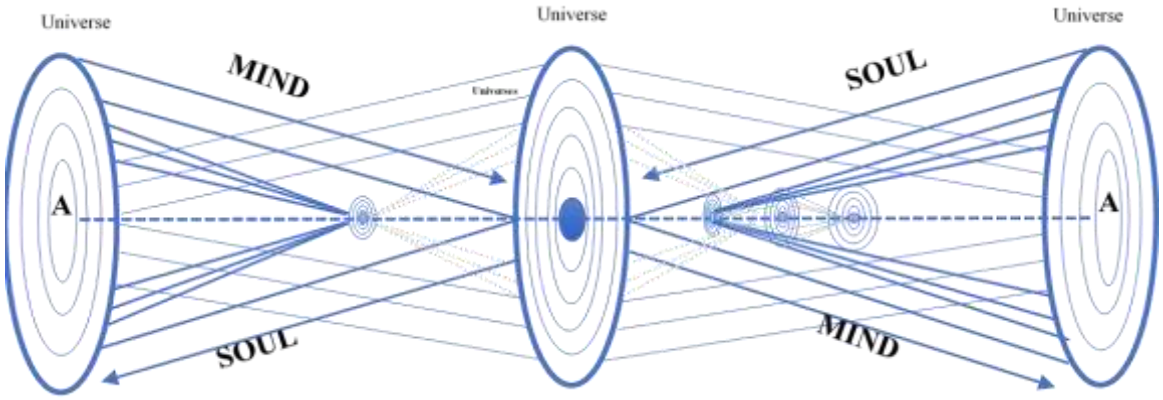

Fig. 8: Mandala Relation—Back Casting and Forecasting Process

4.9 The Development and Speed of AI:

The pace of AI's development is incredibly fast. If human history is compared to a long clock, AI will bring its speed from hours to minutes, and from minutes to seconds. But like any technology, AI will also have to face new challenges over time, such as data bias and ethical questions.

4.10 Mandala and the Social Education of AI:

Mandala-based SLMS mirrors this cognitive process by transforming individual learning experiences into collective knowledge, thereby facilitating the exchange of information among students, teachers, and the community. The comprehensive mandala, which encompasses the perimeter of the many dimensions of human life, their autonomy, dependence, and mutual relationships, has served as a means of carrying social traditions, rituals, religion, customs, and familial environmental relationships. In explaining relationships (networks), among other things, the mandala or its architecture has been applied. These examples show that in social development, knowledge, consciousness, or the transfer of social behaviour, the mandala can be used or itself can serve as a philosophical tool functioning as a societal value “resource tank.”

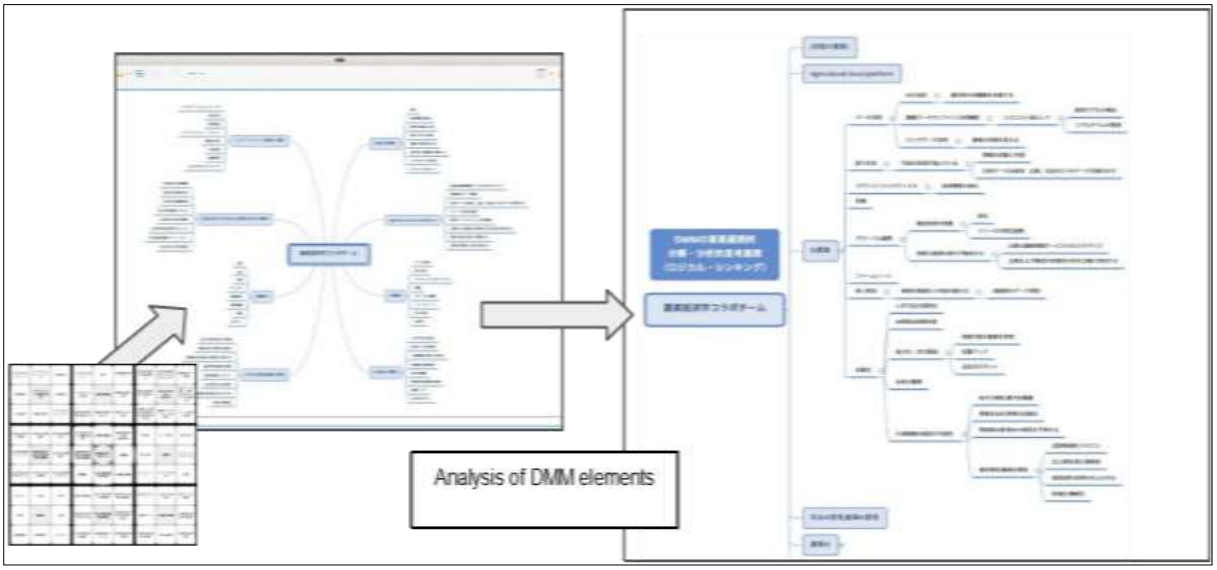

Fig. 9: Mandala LMS Apps

Psychologically, the mandala's structure is deeply connected to the fundamental organization of the human mind. Neuroscientific research has shown that the neural networks in the human brain are arranged in complex, symmetrical patterns that resemble a mandala. This similarity is why mandalas are used in practices like meditation and yoga to promote psychological balance, focused attention, and creative thinking.

4.11 Mandala Platforms in Learning:

Using mandala platforms in education, AI can analyse social networks and support classroom operations with individual and group learning systems. In agriculture, mandala-based models have successfully linked production with social distribution in Japan.

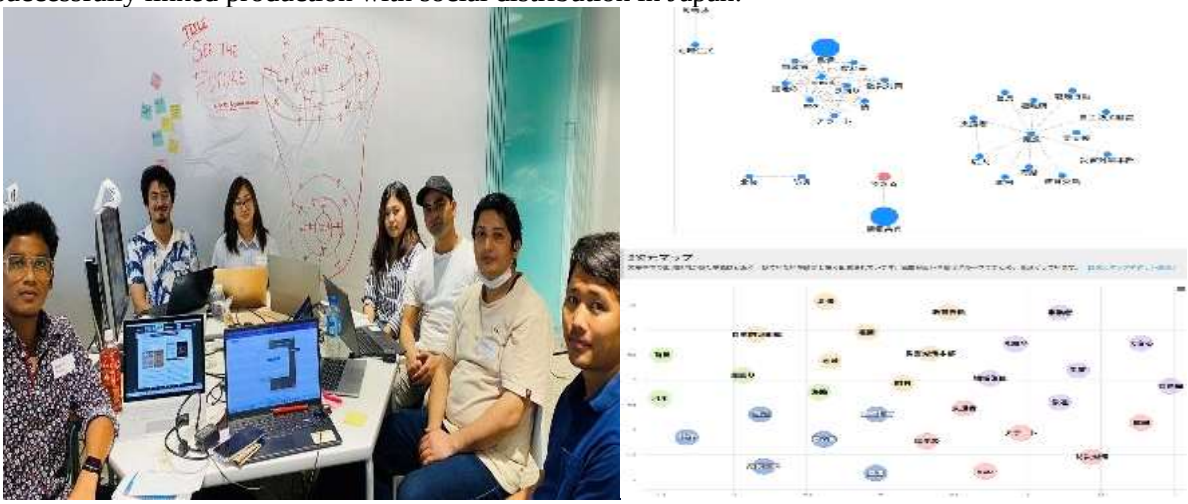

Fig. 10: Scholars Discourse. (Source: Photo from KCGI Students Workshop 2023

4.12 Mandala in Health and Ayurveda:

Workshops on Ayurveda and healthy living explored mandalas as social network tools. These structures help organize Ayurvedic knowledge and promote community health. Research in Nepal shows the potential for linking health and social networks through the mandala system.

4.13 Mandala in Sanskrit Education:

Workshops used mandalas to structure traditional knowledge transmission, making classical learning more interactive and organized. This approach opens new possibilities for integrating Sanskrit education into the modern digital age.

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4.14 SLMS and the Practical Application of the Mandala Concept

The effective use of SLMS in our society further clarifies the concept of the mandala. In the education system:

- Interaction between knowledge accumulation and users.
- Making the education system scalable.
- Providing opportunities for long-term and continuous learning.
- Transmitting knowledge through collective effort.

All these are important aspects of SLMS that align with the mandala principle. The idea that SLMS is a knowledge accumulation process of the mandala concept has been confirmed by educational practices in our society

5. CONCLUSION :

Mandala philosophy provides a model for the education system to organize the flow of societal knowledge, which builds the foundation for continuous learning, shared progress, and collective intelligence. SLMS is helping to establish a powerful, multidimensional, and long-term learning process by integrating this traditional learning system with modern technology.

The mandala links human life meaningfully, influencing behaviour, cognition, consciousness, and self-awareness. It integrates environmental science, astronomy, belief systems, and the arts, functioning as a circular knowledge technology that transforms emotion and understanding into behaviour. In society, the mandap system is a dynamic repository of knowledge, shaping both individual and collective consciousness and enabling intergenerational knowledge transfer.

Theoretically, the mandap bridges spirit and mind, connecting inner consciousness with the outer world, fostering personal peace, contentment, and mental stability. It also transfers moral values, social harmony, and a sense of community, maintaining unity and heritage across generations. Human

emotions navigate this interconnected structure, which remains underexplored scientifically. Mandalas thus offer a method to synchronize social activities with knowledge preservation, representing a powerful tool for social education and management.

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