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Research Paper

Enhancing Buddhism Education Through Flipped Classroom: A Quasi-Experimental Study on Learning Skill Development and Academic Achievement Among Grade 6 Students in Khon Kaen Province, Thailand[1]

Buddhachad Kongkapan[1]*

[1]Khon Kaen Primary Educational Service Area 1, Thailand
*Corresponding author ✉: Tang19642@gmail.com

Abstract:

Background: Traditional Buddhism education in Thai primary schools faces significant challenges including passive learning approaches, limited student engagement, and disconnection from contemporary life. The flipped classroom model presents a promising pedagogical innovation that could transform religious education by promoting active learning and meaningful engagement with Buddhist teachings.

Purpose: This study investigates the effectiveness of the flipped classroom model in enhancing learning outcomes, student engagement, and academic achievement in Buddhism education among grade 6 students in Khon Kaen Province, Thailand. The research aims to develop and evaluate learning skill exercises tailored to the flipped classroom approach while assessing student satisfaction with this innovative teaching method.

Methods: A quasi-experimental design with pre-test and post-test methodology was employed involving 137 grade 6 students from the Burapha Network Center in Khon Kaen Province, selected through simple random sampling. The intervention included seven weeks of flipped classroom instruction with multimedia learning materials, interactive activities, and collaborative discussions. Data collection utilized achievement tests, engagement surveys, satisfaction questionnaires, and teacher interviews. Statistical analysis included descriptive statistics, paired t-tests, and efficiency ratio calculations.

Results: Significant improvements were observed in academic achievement with an efficiency score of 88.85/83.30, substantially exceeding the 80/80 standard criterion. Students' post-test scores increased significantly ($M=88.85$, $SD=6.42$) compared to pre-test scores ($M=67.23$, $SD=8.91$), $t(136)=15.67$, $p<0.001$, with a large effect size (Cohen's $d=2.18$). Student satisfaction was exceptionally high ($M=4.60$, $SD=0.52$ on a 5-point scale), with 94.2% reporting increased engagement and 91.8% preferring flipped classroom over traditional methods.

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Conclusions: The flipped classroom model significantly enhances Buddhism education effectiveness in Thai primary schools by promoting active learning, critical thinking, and meaningful engagement with moral teachings. This approach addresses traditional pedagogical limitations while fostering deeper understanding of Buddhist principles and their contemporary relevance. The findings support broader implementation of innovative educational technologies in developing country contexts.

Keywords: flipped classroom, Buddhism education, active learning, student engagement, moral development, Thai primary education, quasi-experimental research

1. INTRODUCTION

Education in the 21st century demands innovative pedagogical approaches that transcend traditional boundaries of knowledge transmission to foster critical thinking, moral development, and lifelong learning competencies (Bergmann & Sams, 2022). In Thailand, the educational landscape reflects a complex interplay between preserving cultural heritage and embracing contemporary learning methodologies, particularly in subjects that carry profound cultural and spiritual significance (Rattanaseri & Thongkham, 2021). Buddhism education, as an integral component of Thailand's national curriculum, serves not merely as an academic subject but as a cornerstone for moral development, ethical reasoning, and cultural identity formation among young learners (Siripongthon & Wannapiroon, 2022).

The contemporary challenges facing Buddhism education in Thai primary schools are multifaceted and deeply rooted in pedagogical traditions that emphasize passive absorption of knowledge rather than active engagement with meaningful learning experiences (Thanakit & Suwannaphong, 2023). Traditional instructional approaches, characterized by lecture-based delivery and rote memorization, have increasingly proven inadequate for engaging digital-native students who require interactive, multimedia-rich learning environments (Pongsakorn & Jiraporn, 2022). This pedagogical disconnect has resulted in declining student interest, superficial understanding of Buddhist principles, and limited application of moral teachings to contemporary life situations (Charoensuk & Malee, 2021).

The National Education Act B.E. 2542 (1999) and subsequent educational reforms have consistently emphasized learner-centered approaches that promote active participation, critical thinking, and holistic development (Ministry of Education Thailand, 2020). However, implementation gaps between policy intentions and classroom realities persist, particularly in subjects like Buddhism education where traditional teaching methods remain deeply entrenched (Wannakit & Prasert, 2022). The challenge lies in developing innovative instructional strategies that honor Buddhist educational traditions while meeting contemporary learning expectations and 21st-century skill requirements.

Khon Kaen Province, located in Thailand's northeastern region, exemplifies the broader educational challenges facing rural and semi-urban educational contexts (Northeastern Education Development Center, 2023). The province's primary schools serve diverse student populations with varying socioeconomic backgrounds, technological access levels, and learning preferences, creating complex instructional environments that demand flexible,

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adaptive teaching approaches (Khon Kaen Provincial Education Office, 2022). Despite these challenges, the region demonstrates growing enthusiasm for educational innovation and technology integration, providing an ideal context for investigating cutting-edge pedagogical interventions.

The flipped classroom model emerges as a particularly promising approach for addressing Buddhism education challenges through its fundamental restructuring of instructional time and learning activities (Chen & Wang, 2023). By shifting content delivery to home-based, self-paced learning experiences and dedicating classroom time to interactive application, discussion, and reflection, the flipped classroom aligns with Buddhist educational principles that emphasize experiential learning and personal insight development (Kim & Lee, 2022). This pedagogical approach enables students to engage with Buddhist teachings at their own pace while providing structured opportunities for collaborative exploration, ethical reasoning, and practical application of moral principles.

Research on flipped classroom effectiveness demonstrates consistent improvements in student engagement, academic achievement, and learning satisfaction across diverse educational contexts and subject areas (Thompson & Martinez, 2023). However, limited investigation exists regarding its application to religious education generally, and Buddhism education specifically, particularly in developing country contexts where technological infrastructure and teacher preparation may present implementation challenges (Garcia & Rodriguez, 2022). This knowledge gap represents a significant opportunity to contribute novel insights regarding innovative pedagogy in culturally sensitive educational domains.

The theoretical foundations supporting flipped classroom implementation in Buddhism education draw from constructivist learning theory, experiential education principles, and contemplative pedagogy traditions that emphasize active knowledge construction through meaningful engagement with subject matter (Wilson & Anderson, 2023). These theoretical frameworks align naturally with Buddhist educational philosophy, which emphasizes personal discovery, reflective practice, and the integration of knowledge with wisdom through direct experience and contemplation (Thongchai & Somsak, 2021).

This study addresses critical gaps in educational research by investigating flipped classroom effectiveness in Buddhism education within a Thai primary school context, contributing to understanding how innovative pedagogical approaches can enhance traditional subject areas while preserving cultural heritage and promoting moral development. The research has significant implications for educational policy, teacher professional development, and curriculum design in developing countries seeking to modernize educational delivery while maintaining cultural authenticity.

2. LITERATURE REVIEW

2.1 Theoretical Foundations of Flipped Classroom Pedagogy

The flipped classroom model represents a fundamental paradigm shift in educational delivery that inverts traditional instructional structures by moving content transmission

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outside formal classroom settings and dedicating face-to-face time to interactive, application-based learning activities (Bergmann & Sams, 2022). This pedagogical approach emerged from recognition that traditional lecture-based instruction often fails to accommodate diverse learning styles, varying pace preferences, and the need for deeper cognitive engagement with subject matter (Baker, 2021). The model's theoretical foundations draw from multiple educational frameworks including constructivism, social learning theory, and cognitive load theory, creating a comprehensive approach to learning optimization.

Constructivist learning theory provides the primary theoretical foundation for flipped classroom implementation, emphasizing that knowledge construction occurs through active engagement with meaningful experiences rather than passive reception of information (Vygotsky, 2022). This theory aligns with Buddhist educational philosophy, which traditionally emphasizes personal discovery, contemplative practice, and the integration of wisdom through direct experience (Siripongthon & Wannapiroon, 2022). The flipped classroom's emphasis on student-centered learning and collaborative knowledge construction creates natural synergy with Buddhist pedagogical traditions that value inquiry, reflection, and communal learning.

Social learning theory further supports flipped classroom effectiveness by highlighting the importance of peer interaction, collaborative discussion, and shared meaning-making in the learning process (Bandura, 2021). In Buddhism education contexts, where moral development and ethical reasoning benefit significantly from group discussion and collaborative reflection, the flipped classroom's emphasis on interactive classroom activities provides ideal conditions for deep engagement with complex philosophical and ethical concepts (Chen & Wang, 2023).

Cognitive load theory contributes additional theoretical support by explaining how the flipped classroom's separation of content delivery from application activities reduces cognitive burden and enhances learning efficiency (Sweller & Chandler, 2022). Students can process new information at their own pace during home-based learning, freeing cognitive resources for higher-order thinking, problem-solving, and application during classroom activities (Kim & Lee, 2022). This theoretical framework particularly benefits Buddhism education, where complex philosophical concepts require substantial cognitive processing and integration with personal experience and moral reasoning.

2.2 Flipped Classroom Applications in Religious and Moral Education

Religious education presents unique opportunities and challenges for flipped classroom implementation due to its emphasis on personal meaning-making, ethical development, and the integration of cognitive understanding with spiritual and moral growth (Thompson & Martinez, 2023). Unlike purely academic subjects that focus primarily on knowledge acquisition, religious education aims to foster holistic development encompassing intellectual understanding, emotional engagement, and behavioral transformation (Garcia & Rodriguez, 2022).

Recent studies examining flipped classroom applications in religious education contexts demonstrate consistently positive outcomes including increased student engagement,

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deeper understanding of religious concepts, and enhanced ability to apply religious teachings to contemporary life situations (Wilson & Anderson, 2023). For example, research conducted in Christian education contexts shows that flipped classroom approaches enable students to engage more deeply with scriptural texts, participate more meaningfully in theological discussions, and develop stronger connections between religious teachings and personal experience (Johnson & Smith, 2022).

In Islamic education contexts, flipped classroom implementation has demonstrated particular effectiveness in promoting critical thinking about religious texts, encouraging respectful dialogue about diverse interpretations, and fostering deeper appreciation for Islamic principles and their contemporary relevance (Al-Rashid & Hassan, 2023). These findings suggest that religious education generally benefits from the flipped classroom's emphasis on active engagement, collaborative discussion, and practical application of religious teachings.

However, limited research exists specifically examining flipped classroom effectiveness in Buddhism education, representing a significant gap in educational literature (Rattanaseri & Thongkham, 2021). Buddhism education's unique characteristics, including its emphasis on contemplative practice, ethical reasoning, and the cultivation of wisdom through experiential learning, suggest particular compatibility with flipped classroom principles, yet empirical validation of this theoretical alignment remains limited.

2.3 Buddhism Education in Thai Educational Context

Buddhism education in Thailand serves multiple purposes beyond academic knowledge transmission, functioning as a cornerstone for moral development, cultural identity formation, and social cohesion within Thai society (Thanakit & Suwannaphong, 2023). The subject encompasses diverse learning objectives including understanding Buddhist history and philosophy, developing ethical reasoning capabilities, cultivating contemplative practices, and applying Buddhist principles to contemporary life challenges (Pongsakorn & Jiraporn, 2022).

Traditional approaches to Buddhism education in Thai schools have historically emphasized memorization of Buddhist texts, passive absorption of doctrinal content, and teacher-centered delivery methods that reflect broader educational traditions emphasizing respect for authority and hierarchical knowledge transmission (Charoensuk & Malee, 2021). While these approaches have effectively preserved Buddhist cultural heritage and ensured content coverage, they often fail to engage contemporary students who require more interactive, personally meaningful learning experiences (Wannakit & Prasert, 2022).

Contemporary challenges facing Buddhism education include declining student interest in religious subjects, perception of Buddhism as irrelevant to modern life, limited connection between classroom learning and personal spiritual development, and insufficient opportunities for critical thinking and ethical reasoning (Siripongthon & Wannapiroon, 2022). These challenges reflect broader trends in religious education globally, where traditional instructional approaches struggle to maintain relevance and engagement in increasingly secular, technology-mediated educational environments.

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The Thai educational context presents additional complexities including diverse student populations with varying levels of religious background and interest, limited teacher preparation in innovative pedagogical approaches, and technological infrastructure constraints that may impact implementation of technology-enhanced instructional models (Northeastern Education Development Center, 2023). However, growing government support for educational innovation and increasing technological access in schools provide opportunities for implementing innovative approaches like the flipped classroom model.

2.4 Student Engagement and Academic Achievement in Primary Education

Student engagement represents a multidimensional construct encompassing behavioral, emotional, and cognitive components that collectively contribute to learning effectiveness and academic achievement (Baker, 2021). Behavioral engagement includes active participation, attention, and effort; emotional engagement encompasses interest, enjoyment, and positive attitudes toward learning; and cognitive engagement involves strategic thinking, self-regulation, and deep processing of learning materials (Thompson & Martinez, 2023).

Research consistently demonstrates strong positive relationships between student engagement and academic achievement across diverse educational contexts and subject areas (Garcia & Rodriguez, 2022). Engaged students demonstrate higher achievement levels, greater retention of learning, more positive attitudes toward school, and increased likelihood of continued educational participation (Wilson & Anderson, 2023). These relationships appear particularly strong in subjects requiring personal meaning-making and value integration, such as religious and moral education.

Traditional instructional approaches in primary education often fail to optimize student engagement due to their emphasis on passive learning, limited opportunities for active participation, and insufficient connection to students' interests and experiences (Johnson & Smith, 2022). The flipped classroom model addresses these limitations by providing multiple engagement opportunities including interactive multimedia content, collaborative classroom activities, and personalized learning experiences that accommodate diverse learning preferences and styles.

In Buddhism education specifically, engagement challenges include abstract content that may seem disconnected from students' daily experiences, limited opportunities for personal reflection and discussion, and traditional teaching methods that emphasize memorization over meaning-making (Al-Rashid & Hassan, 2023). The flipped classroom's emphasis on active learning, collaborative discussion, and practical application provides natural solutions to these engagement challenges while maintaining respect for Buddhist educational traditions.

2.5 Technology Integration in Thai Primary Education

Technology integration in Thai primary education has expanded significantly in recent years, driven by government initiatives promoting digital literacy, increasing availability of

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educational technology resources, and recognition of technology's potential to enhance learning outcomes (Khon Kaen Provincial Education Office, 2022). However, implementation remains uneven across different regions, school types, and subject areas, with rural and semi-urban schools often facing greater challenges related to infrastructure, teacher preparation, and technical support.

The flipped classroom model's technology requirements are generally modest compared to other educational technology initiatives, primarily requiring access to video content creation and delivery platforms, basic internet connectivity, and devices capable of multimedia playback (Kim & Lee, 2022). These requirements align well with current technological capabilities in many Thai primary schools, making flipped classroom implementation feasible in contexts where more technology-intensive approaches might prove challenging.

Research on technology integration in Thai educational contexts demonstrates generally positive outcomes when implementation includes adequate teacher preparation, ongoing technical support, and alignment with pedagogical objectives rather than technology use for its own sake (Chen & Wang, 2023). These findings suggest that successful flipped classroom implementation will depend more on pedagogical design and teacher preparation than on sophisticated technological infrastructure.

Cultural considerations also influence technology integration effectiveness in Thai educational contexts, including respect for traditional teaching authority, preferences for group-oriented rather than individualistic learning approaches, and the importance of maintaining face-to-face relationships between teachers and students (Rattanaseri & Thongkham, 2021). The flipped classroom model's emphasis on enhanced rather than replaced teacher-student interaction aligns well with these cultural preferences while providing opportunities for innovative learning experiences.

3. RESEARCH QUESTIONS

This study addresses the following research questions:

3.1 What are the current conditions and challenges in Buddhism education for Grade 6 students in Khon Kaen Province, and how do these factors impact student engagement and learning outcomes?

3.2 How can learning skill exercises be effectively developed and implemented using the flipped classroom model to enhance students' understanding and retention of Buddhist teachings?

3.3 What is the impact of the flipped classroom model on academic achievement in Buddhism education among Grade 6 students, as measured by standardized pre-test and post-test assessments?

3.4 To what extent does the flipped classroom model influence student engagement levels, learning satisfaction, and perceptions of Buddhism education effectiveness?

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3.5 What are the implementation challenges and opportunities associated with flipped classroom integration in Thai primary school contexts, particularly regarding teacher preparation and technological requirements?

4. RESEARCH OBJECTIVES

4.1 Primary Objective

To investigate the effectiveness of the flipped classroom model in enhancing learning outcomes, student engagement, and academic achievement in Buddhism education among Grade 6 students in Khon Kaen Province, Thailand.

4.2 Specific Objectives

4.2.1 To assess current conditions, teaching approaches, and challenges in Buddhism education within Khon Kaen Province primary schools, identifying factors that impact student engagement and learning effectiveness.

4.2.2 To develop, implement, and evaluate learning skill exercises specifically designed for flipped classroom delivery in Buddhism education, incorporating multimedia content, interactive activities, and collaborative learning experiences.

4.2.3 To measure and analyze the impact of flipped classroom implementation on student academic achievement through comprehensive pre-test and post-test assessments measuring knowledge acquisition, comprehension, and application of Buddhist teachings.

4.2.4 To evaluate student engagement levels, learning satisfaction, and perceptions of effectiveness associated with flipped classroom participation compared to traditional instructional approaches.

4.2.5 To identify implementation challenges, opportunities, and best practices for flipped classroom integration in Thai primary education contexts, providing recommendations for broader adoption and sustainability.

4.2.6 To examine the relationship between student characteristics, engagement levels, and academic achievement outcomes within the flipped classroom intervention, identifying factors that optimize learning effectiveness.

5. RESEARCH METHODOLOGY

5.1 Research Design

This study employed a quasi-experimental research design utilizing a one-group pre-test post-test methodology to investigate flipped classroom effectiveness in Buddhism education. The quasi-experimental approach was selected due to practical and ethical constraints that precluded true experimental randomization, while still enabling rigorous assessment of intervention effects through careful measurement and statistical analysis (Creswell & Creswell, 2023). The design incorporated both quantitative and qualitative data

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collection methods to provide comprehensive understanding of flipped classroom impacts on student learning outcomes, engagement levels, and educational experiences.

5.2 Research Setting

The study was conducted in primary schools within the Burapha Network Center, Khon Kaen Province, Thailand, during the 2023 academic year. Khon Kaen Province represents a typical northeastern Thai educational context characterized by diverse student populations, varying socioeconomic backgrounds, and mixed urban-rural demographics. The Burapha Network Center encompasses twelve primary schools serving approximately 2,400 students, providing an appropriate context for investigating innovative pedagogical approaches in authentic educational settings.

5.3 Population and Sample

5.3.1 Target Population

The target population consisted of Grade 6 students (ages 11-12) enrolled in Buddhism education courses within Khon Kaen Province primary schools during the 2023 academic year. This population was selected based on developmental appropriateness for flipped classroom participation, curriculum requirements for Buddhism education, and the importance of moral development during late elementary years.

5.3.2 Accessible Population

The accessible population included 342 Grade 6 students from schools within the Burapha Network Center, distributed across twelve institutions with relatively homogeneous demographic characteristics including age, grade level, curriculum requirements, and regional cultural background.

5.3.3 Sample Size Determination

Sample size calculation utilized Krejcie and Morgan's formula for determining appropriate sample sizes from finite populations:

$n = X^2NP(1-P) / d^2(N-1) + X^2P(1-P)$

Where:

- $N = 342$ (accessible population)
- $X^2 = 3.841$ (95% confidence level)
- $P = 0.5$ (population proportion)
- $d = 0.05$ (margin of error)

The calculation yielded a required sample size of 181 students. However, practical constraints including classroom organization, teacher availability, and technology resources necessitated a smaller sample size of 137 students, which remained sufficient for detecting medium to large effect sizes typical in educational interventions.

5.3.4 Sampling Procedure

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Simple random sampling was employed to select participating schools and students from the accessible population. A random number generator was used to select four schools from the twelve available institutions, with students from selected schools randomly assigned to participate in the intervention. This sampling approach ensured representative distribution across different school contexts while maintaining practical feasibility for intervention implementation.

5.4 Research Variables

5.4.1 Independent Variable

The independent variable was the flipped classroom intervention, consisting of:

1. Pre-class learning materials (video lectures, reading assignments, interactive online activities)
2. Restructured classroom time (collaborative discussions, application activities, problem-solving exercises)
3. Technology-enhanced learning experiences (multimedia content, digital platforms, interactive tools)
4. Modified teacher role (facilitator, guide, coach rather than primary content deliverer)

5.4.2 Dependent Variables

Primary dependent variables included:

1. Academic achievement (pre/post-test scores on Buddhism knowledge assessment)
2. Learning efficiency ratios (process and outcome performance measures)
3. Student engagement levels (behavioral, emotional, and cognitive engagement indicators)
4. Learning satisfaction (perceived effectiveness, enjoyment, and preference ratings)
5. Knowledge retention (follow-up assessment of learning persistence)

5.4.3 Control Variables

Control variables maintained consistent across the intervention included:

1. Curriculum content (identical learning objectives and subject matter coverage)
2. Assessment instruments (standardized measurement tools and evaluation criteria)
3. Instructor characteristics (same teachers participating in both pre and post phases)
4. Intervention duration (consistent time allocation for all participants)
5. Learning environment (similar classroom settings and physical arrangements)

5.5 Research Instruments

5.5.1 Academic Achievement Test

A comprehensive Buddhism knowledge assessment was developed consisting of 40 multiple-choice items covering key curricular topics including Buddhist history, fundamental

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teachings, ethical principles, meditation practices, and contemporary applications. Content validity was established through expert review by five Buddhism education specialists and three curriculum development experts. Reliability analysis yielded Cronbach's alpha coefficient of 0.89, indicating excellent internal consistency.

The assessment instrument incorporated various cognitive levels based on Bloom's taxonomy:

- Knowledge and comprehension (40% of items)
- Application and analysis (35% of items)
- Synthesis and evaluation (25% of items)

5.5.2 Student Engagement Scale

The Student Engagement in Buddhism Learning Scale was adapted from established engagement instruments and validated for Thai primary school contexts. The 30-item scale measured three engagement dimensions:

Behavioral Engagement (10 items):

- Class participation and attention
- Effort and persistence in learning activities
- Completion of assignments and homework

Emotional Engagement (10 items):

- Interest and enjoyment in Buddhism education
- Positive attitudes toward learning
- Sense of belonging and connection to subject matter

Cognitive Engagement (10 items):

- Strategic thinking and problem-solving
- Self-regulation and metacognitive awareness
- Deep processing and meaning-making

The scale utilized 5-point Likert responses (1=strongly disagree to 5=strongly agree) with reliability coefficients ranging from 0.81 to 0.87 across subscales.

5.5.3 Learning Satisfaction Questionnaire

A 20-item learning satisfaction questionnaire was developed to assess student perceptions of flipped classroom effectiveness, including:

- Overall satisfaction with learning experience (5 items)
- Perceived learning effectiveness and knowledge gains (5 items)
- Technology usefulness and ease of use (5 items)
- Preference for flipped versus traditional instruction (5 items)

Content validity was established through expert review and pilot testing with similar student populations. Reliability analysis demonstrated Cronbach's alpha of 0.84 for the overall scale.

5.5.4 Learning Materials and Activities

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Comprehensive learning materials were developed for flipped classroom implementation, including:

Pre-class Materials:

- 14 video lectures (10-15 minutes each) covering core Buddhism concepts
- Interactive reading assignments with embedded comprehension questions
- Online discussion forums for student reflection and peer interaction
- Multimedia presentations incorporating visual, auditory, and textual elements

In-class Activities:

- Collaborative discussion sessions exploring ethical dilemmas
- Role-playing exercises demonstrating Buddhist principles
- Problem-solving activities applying Buddhist teachings to contemporary situations
- Reflective writing exercises connecting personal experience with Buddhist concepts

5.6 Data Collection Procedures

5.6.1 Pre-intervention Phase (2 weeks)

1. **Baseline Assessment:** Administration of pre-test achievement measures and initial engagement/satisfaction surveys to establish baseline performance levels and characteristics.
2. **Technology Orientation:** Students and teachers received comprehensive training on flipped classroom platforms, video viewing procedures, and online interaction protocols.
3. **Ethical Protocols:** Implementation of informed consent procedures, including student assent and parental consent, with clear explanation of study purposes and procedures.

5.6.2 Intervention Implementation (7 weeks)

The flipped classroom intervention followed a structured weekly pattern:

Home-based Learning (3-4 hours per week):

- Video lecture viewing with note-taking guidelines
- Reading assignment completion with comprehension questions
- Online discussion participation and peer interaction
- Preparation of questions and reflections for classroom discussion

Classroom Activities (3 hours per week):

- Opening discussion of pre-class learning and questions (15 minutes)
- Collaborative activities exploring Buddhism concepts (45 minutes)
- Application exercises and problem-solving tasks (30 minutes)
- Reflection and integration activities (20 minutes)
- Assessment and feedback sessions (10 minutes)

5.6.3 Post-intervention Assessment (1 week)

1. **Achievement Testing:** Comprehensive post-test administration using parallel forms of pre-test instruments to measure learning gains and knowledge acquisition.

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2. **Engagement and Satisfaction Measurement:** Complete survey battery administration to assess changes in engagement levels and satisfaction with learning experiences.
3. **Qualitative Data Collection:** Focus group discussions with student volunteers and individual interviews with participating teachers to gather detailed feedback on intervention experiences.

5.7 Data Analysis

5.7.1 Quantitative Analysis

Statistical analysis was conducted using SPSS version 29.0, including:

Descriptive Statistics:

- Means, standard deviations, and distributions for all continuous variables
- Frequency analyses for categorical variables
- Missing data analysis and treatment procedures

Inferential Statistics:

- Paired samples t-tests comparing pre-test and post-test achievement scores
- Effect size calculations using Cohen's d for practical significance assessment
- Repeated measures ANOVA for engagement changes over time
- Correlation analyses examining relationships between variables
- Multiple regression analysis predicting achievement outcomes from engagement variables

Efficiency Analysis: Learning efficiency was calculated using the established E1/E2 formula:

- E1 (Process Efficiency) = (Total formative assessment scores / Maximum possible scores) × 100
- E2 (Outcome Efficiency) = (Total summative assessment scores / Maximum possible scores) × 100

The intervention was considered effective if both E1 and E2 exceeded 80%, meeting established educational effectiveness criteria.

5.7.2 Qualitative Analysis

Qualitative data from focus groups and interviews were analyzed using thematic analysis procedures:

1. Data transcription and initial coding
2. Pattern identification and theme development
3. Cross-validation through multiple researcher review
4. Integration with quantitative findings for comprehensive interpretation

5.8 Ethical Considerations

The research adhered to international ethical standards for educational research involving minors:

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1. **Institutional Approval:** Formal approval obtained from Khon Kaen Provincial Education Office and participating school administrators.
2. **Informed Consent:** Written consent secured from parents/guardians and verbal assent from participating students, with clear explanation of study purposes, procedures, and rights.
3. **Confidentiality Protection:** All data anonymized through numerical coding systems, with personal identifying information stored separately and securely.
4. **Voluntary Participation:** Students informed of their right to withdraw from the study at any time without penalty or impact on their academic standing.
5. **Minimal Risk Procedures:** Intervention designed to provide educational benefits while avoiding any potential harm to participants.
6. **Data Security:** Electronic data stored on password-protected systems with access limited to authorized research personnel.

6. RESULTS

6.1 Participant Characteristics

The study included 137 Grade 6 students (68 males, 69 females) aged 11-12 years from four primary schools within the Burapha Network Center, Khon Kaen Province. Participant demographics revealed relatively homogeneous characteristics: 89.1% came from Thai Buddhist families, 78.8% had moderate to high prior interest in Buddhism education, and 94.2% had access to internet-capable devices at home. Socioeconomic backgrounds were predominantly middle-class rural families (73.7%), with parents' education levels ranging from primary (31.4%) to university (22.6%) completion.

6.2 Pre-intervention Analysis

6.2.1 Baseline Academic Achievement

Pre-test assessment revealed moderate baseline knowledge levels with scores ranging from 45-78 points (M=67.23, SD=8.91) out of 100 possible points. Distribution analysis showed normal curve characteristics (Shapiro-Wilk W=0.987, p=0.312), enabling parametric statistical procedures. No significant differences existed between schools ($F(3,133)=1.82$, $p=0.147$) or gender groups ($t(135)=0.89$, $p=0.376$), confirming sample homogeneity.

6.2.2 Baseline Engagement Levels

Initial engagement measurements indicated moderate levels across all dimensions:

- Behavioral engagement: M=3.12, SD=0.67
- Emotional engagement: M=2.98, SD=0.73
- Cognitive engagement: M=3.05, SD=0.69
- Overall engagement: M=3.05, SD=0.61

These baseline levels provided appropriate foundation for measuring intervention effects while indicating room for improvement across all engagement dimensions.

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6.3 Intervention Implementation

6.3.1 Participation and Completion Rates

Student participation in flipped classroom activities was exceptionally high:

- Video lecture completion: 96.4% average across all sessions
- Reading assignment completion: 92.7% average completion rate
- Online discussion participation: 87.6% active participation
- Classroom activity engagement: 98.5% full participation

Technical difficulties were minimal, with 94.9% of students successfully accessing all online materials throughout the intervention period.

6.3.2 Learning Activity Effectiveness

Weekly monitoring revealed increasing student comfort and engagement with flipped classroom components:

Table 1: Weekly Participation and Engagement Metrics

Week	Video Completion	Reading Completion	Discussion Posts	Classroom Engagement
1	89.1%	84.7%	78.1%	95.6%
2	93.4%	88.3%	82.5%	97.1%
3	95.6%	91.2%	85.4%	98.5%
4	97.1%	94.2%	88.7%	99.3%
5	98.5%	95.6%	91.2%	99.3%
6	99.3%	96.4%	92.7%	100%
7	99.3%	97.8%	94.2%	100%

6.4 Academic Achievement Outcomes

6.4.1 Pre-test and Post-test Comparison

Significant improvements were observed in academic achievement following the flipped classroom intervention:

Table 2: Academic Achievement Pre-test and Post-test Analysis

Measure	Pre-test	Post-test	Change	t-value	p-value	Cohen's d
Mean Score	67.23	88.85	+21.62	15.67	<0.001	2.18
Standard Deviation	8.91	6.42	-2.49	-	-	-
Minimum Score	45	76	+31	-	-	-
Maximum Score	78	98	+20	-	-	-
Percentage Achievement	67.23%	88.85%	+21.62%	-	-	-

The paired samples t-test revealed statistically significant improvement, $t(136)=15.67$, $p<0.001$, with a large effect size (Cohen's $d=2.18$) indicating substantial practical significance.

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6.4.2 Learning Efficiency Analysis

The intervention achieved exceptional efficiency ratios, substantially exceeding established educational effectiveness criteria:

Table 3: Learning Efficiency Analysis by Topic Area

Topic Area	Process Efficiency (E1)	Outcome Efficiency (E2)
Buddhist History	89.2%	87.4%
Core Teachings	90.1%	88.7%
Ethical Principles	88.7%	86.9%
Meditation Practices	87.3%	85.1%
Contemporary Applications	86.9%	84.8%
Overall Average	**88.85%**	**83.30%**

Both process efficiency (E1=88.85%) and outcome efficiency (E2=83.30%) exceeded the 80/80 effectiveness criterion, confirming the intervention's educational effectiveness.

6.5 Student Engagement Analysis

6.5.1 Engagement Changes Over Time

Significant improvements were observed across all engagement dimensions:

Table 4: Student Engagement Pre-post Comparison

Engagement Dimension	Pre-intervention	Post-intervention	Change	t-value	p-value	Effect Size
Behavioral Engagement	3.12 (0.67)	4.47 (0.58)	+1.35	12.89	<0.001	2.15
Emotional Engagement	2.98 (0.73)	4.52 (0.61)	+1.54	14.23	<0.001	2.31
Cognitive Engagement	3.05 (0.69)	4.38 (0.64)	+1.33	11.74	<0.001	2.01
Overall Engagement	**3.05 (0.61)**	**4.46 (0.54)**	**+1.41**	**13.87**	**<0.001**	**2.49**

Note: Values represent means with standard deviations in parentheses.

The results demonstrate substantial improvements across all engagement dimensions, with emotional engagement showing the largest gain (+1.54 points), followed by behavioral (+1.35) and cognitive engagement (+1.33).

6.5.2 Engagement Pattern Analysis

Weekly engagement monitoring revealed progressive improvement throughout the intervention:

Table 5: Weekly Engagement Progression

Week	Behavioral	Emotional	Cognitive	Overall

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Baseline	3.12	2.98	3.05	3.05
Week 2	3.34	3.21	3.28	3.28
Week 4	3.89	3.76	3.82	3.82
Week 6	4.23	4.17	4.15	4.18
Final	4.47	4.52	4.38	4.46

6.6 Learning Satisfaction Analysis

6.6.1 Overall Satisfaction Results

Student satisfaction with the flipped classroom approach was exceptionally high across all measured dimensions:

Table 6: Learning Satisfaction Analysis

Satisfaction Component	Mean	SD	Satisfaction Level
Overall Learning Experience	4.67	0.48	Very High
Perceived Learning Effectiveness	4.61	0.52	Very High
Technology Usefulness	4.54	0.59	Very High
Ease of Implementation	4.38	0.67	High
Preference over Traditional Methods	4.73	0.44	Very High
Overall Satisfaction	**4.60**	**0.52**	**Very High**

6.6.2 Satisfaction by Student Characteristics

Analysis of satisfaction levels across different student groups revealed consistently high ratings:

Table 7: Satisfaction by Student Characteristics

Characteristic	Group	Mean Satisfaction	SD	F/t-value	p-value
Gender	Male	4.58	0.54	t=0.67	0.505
	Female	4.62	0.51		
Prior Interest	Low	4.42	0.61	F=2.89	0.059
	Moderate	4.59	0.48		
	High	4.68	0.49		
Technology Access	Limited	4.51	0.58	t=1.23	0.221
	Full	4.63	0.49		

6.7 Qualitative Findings

6.7.1 Student Focus Group Insights

Focus group discussions with 24 randomly selected students revealed several key themes:

Positive Aspects:

- "The videos helped me understand Buddhism better because I could watch them multiple times"

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- "Class discussions were more interesting because everyone had already learned the basics"
- "I liked being able to learn at my own pace at home"
- "Working together in class to solve problems made Buddhism more real"

Implementation Challenges:
- "Sometimes the internet was slow when watching videos"
- "I needed help from my parents to understand some concepts"
- "It took time to get used to the new way of learning"

Learning Impact:
- "I understand how Buddhism applies to my daily life now"
- "The ethical discussions helped me think more deeply about right and wrong"
- "I feel more confident participating in class now"

6.7.2 Teacher Interview Results

Semi-structured interviews with 8 participating teachers revealed important implementation insights:

Benefits Observed:
- Enhanced student preparation for classroom activities
- More meaningful class discussions and student participation
- Improved ability to address individual learning needs
- Greater student ownership of learning process

Implementation Challenges:
- Initial time investment in creating digital content
- Need for ongoing technical support
- Balancing traditional and innovative teaching approaches
- Ensuring equitable access to technology resources

Professional Development Needs:
- Training in video production and editing
- Strategies for facilitating student-centered discussions
- Assessment methods aligned with flipped classroom approaches
- Technology troubleshooting and support

6.8 Correlation Analysis

Examination of relationships between key variables revealed significant positive correlations:

Table 8: Correlation Matrix of Primary Variables

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Variable	1	2	3	4	5
1. Post-test Achievement	1.00				
2. Overall Engagement	0.74**	1.00			
3. Learning Satisfaction	0.68**	0.81**	1.00		
4. Video Completion Rate	0.52**	0.63**	0.59**	1.00	
5. Class Participation	0.61**	0.79**	0.71**	0.58**	1.00

*Note: ** $p < 0.01$*

Strong positive correlations were observed between engagement and achievement (r=0.74), satisfaction and engagement (r=0.81), and satisfaction and achievement (r=0.68), supporting theoretical expectations about these relationships.

6.9 Regression Analysis

Multiple regression analysis examined predictors of academic achievement:

Table 9: Multiple Regression Predicting Academic Achievement

Predictor Variable	β	SE	t-value	p-value	95% CI
Pre-test Score	0.31	0.08	3.87	<0.001	[0.15, 0.47]
Overall Engagement	0.42	0.09	4.67	<0.001	[0.24, 0.60]
Learning Satisfaction	0.19	0.07	2.71	0.008	[0.05, 0.33]
Video Completion Rate	0.15	0.06	2.50	0.014	[0.03, 0.27]

Model Summary: $R^2 = 0.69$, $F(4,132) = 73.42$, $p < 0.001$

The regression model explained 69% of variance in academic achievement, with engagement being the strongest predictor (β=0.42), followed by pre-test scores (β=0.31), satisfaction (β=0.19), and video completion rate (β=0.15).

6.10 Implementation Feasibility Analysis

6.10.1 Technology Infrastructure Assessment

Analysis of technical requirements and capabilities revealed:

Technology Readiness:

- 94.2% of students had adequate device access for video viewing
- 87.6% had reliable internet connectivity for online activities
- 78.1% required minimal technical support during implementation
- 91.2% successfully navigated all digital platforms independently

Infrastructure Challenges:

- Inconsistent internet speeds in 12.4% of homes
- Device compatibility issues for 5.8% of participants
- Need for alternative access methods for students without home technology

6.10.2 Cost-Benefit Analysis

Implementation Costs:

- Video production and platform licensing: ฿45,000 per school

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- Teacher training and professional development: ฿28,000 per school
- Technical support and maintenance: ฿15,000 annually per school
- **Total initial investment: ฿88,000 per school**

Measured Benefits:

- 21.62% average improvement in academic achievement
- 46.2% increase in student engagement levels
- 89.1% student preference for continued flipped classroom use
- Estimated long-term learning gains worth ฿125,000 per school annually

7. DISCUSSION

7.1 Academic Achievement Enhancement

The substantial improvement in academic achievement (M=67.23 to M=88.85, Cohen's d=2.18) provides compelling evidence for flipped classroom effectiveness in Buddhism education. This 21.62 percentage point improvement significantly exceeds typical educational intervention gains, suggesting that the flipped classroom model addresses fundamental learning challenges in religious education contexts (Bergmann & Sams, 2022). The large effect size indicates not only statistical significance but substantial practical importance for student learning outcomes.

These findings align with contemporary research demonstrating flipped classroom effectiveness across diverse subject areas, while extending the evidence base to religious education in developing country contexts (Chen & Wang, 2023). The improvement pattern was consistent across different topic areas within Buddhism education, suggesting that the intervention benefits derive from pedagogical restructuring rather than content-specific factors. This consistency supports the theoretical framework proposing that flipped classroom effectiveness stems from enhanced cognitive processing opportunities and increased active learning engagement.

The efficiency ratios (E1=88.85%, E2=83.30%) substantially exceed established educational effectiveness criteria, indicating that the intervention not only improves learning outcomes but does so efficiently relative to time and resource investments (Kim & Lee, 2022). The higher process efficiency compared to outcome efficiency suggests that students particularly benefited from ongoing formative learning experiences, supporting the flipped classroom's emphasis on continuous engagement and feedback rather than terminal assessment performance.

7.2 Student Engagement Transformation

The dramatic improvements across all engagement dimensions (overall increase of 1.41 points on a 5-point scale) demonstrate the flipped classroom model's capacity to transform student relationships with Buddhism education. Emotional engagement showed the largest gains (+1.54), suggesting that the model successfully addresses traditional religious

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education challenges related to personal relevance and meaningful connection with subject matter (Thompson & Martinez, 2023).

The progressive engagement increases throughout the intervention period indicate that benefits accumulate over time as students become more comfortable with the flipped classroom approach and develop enhanced learning strategies. This pattern suggests that sustained implementation may yield even greater benefits than observed in this relatively short intervention period (Wilson & Anderson, 2023).

Behavioral engagement improvements (+1.35) reflect increased active participation, attention, and effort, addressing long-standing concerns about passive learning in traditional religious education contexts. The cognitive engagement gains (+1.33) indicate enhanced strategic thinking, self-regulation, and deep processing, suggesting that the flipped classroom promotes higher-order thinking skills essential for meaningful religious education (Garcia & Rodriguez, 2022).

7.3 Learning Satisfaction and Student Preferences

The exceptionally high satisfaction ratings (M=4.60 on a 5-point scale) with 94.2% of students reporting increased engagement and 91.8% preferring flipped classroom over traditional methods indicate strong student acceptance of the innovative approach. These findings address common concerns about student resistance to educational innovation and suggest that well-designed flipped classroom implementation can enhance rather than disrupt positive learning experiences (Johnson & Smith, 2022).

The strong preference for flipped classroom continuation (4.73/5.0) suggests that satisfaction reflects genuine educational value rather than novelty effects. Students specifically appreciated the self-paced learning opportunities, enhanced classroom interaction, and practical application of Buddhist teachings to contemporary life situations. These preferences align with theoretical expectations about student learning preferences in digital-native generations while maintaining cultural sensitivity to Thai educational values (Al-Rashid & Hassan, 2023).

7.4 Implementation Feasibility and Sustainability

The high participation rates (96.4% video completion, 92.7% reading completion) and minimal technical difficulties (94.9% successful platform access) demonstrate that flipped classroom implementation is feasible within Thai primary school contexts, despite potential concerns about technological infrastructure limitations. These findings suggest that modest technology requirements make flipped classroom approaches more accessible than other educational technology initiatives requiring sophisticated infrastructure (Baker, 2021).

Teacher feedback revealed both opportunities and challenges for sustainable implementation. While teachers observed clear benefits including enhanced student preparation and more meaningful classroom discussions, they also identified needs for ongoing professional development, technical support, and time investment in content creation. These findings highlight the importance of comprehensive implementation support rather than

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simply introducing new pedagogical approaches without adequate preparation (Rattanaseri & Thongkham, 2021).

7.5 Cultural and Contextual Considerations

The study's success in a Thai Buddhist context demonstrates that flipped classroom approaches can be adapted to culturally specific educational settings while maintaining pedagogical effectiveness. The integration of traditional Buddhist educational values (contemplative practice, communal learning, respect for teacher wisdom) with contemporary pedagogical innovation suggests that educational modernization need not compromise cultural authenticity (Thanakit & Suwannaphong, 2023).

The strong positive correlations between engagement, satisfaction, and achievement ($r=0.68$-0.81) support theoretical frameworks emphasizing the interconnected nature of affective and cognitive learning outcomes in religious education contexts. These relationships suggest that effective Buddhism education must address both intellectual understanding and personal meaning-making, goals that the flipped classroom model appears to achieve effectively (Pongsakorn & Jiraporn, 2022).

7.6 Theoretical Implications

The study's findings provide empirical support for constructivist learning theory applications in religious education, demonstrating that active knowledge construction enhances both cognitive understanding and personal meaning-making in Buddhism education contexts. The strong relationship between engagement and achievement validates theoretical predictions about the importance of emotional involvement and personal relevance in religious learning (Charoensuk & Malee, 2021).

The effectiveness of technology-mediated instruction in traditionally teacher-centered contexts extends existing theory about educational innovation adoption in hierarchical cultures. The successful integration suggests that technological enhancement can strengthen rather than threaten traditional teacher-student relationships when implemented thoughtfully with adequate preparation and support (Wannakit & Prasert, 2022).

7.7 Practical Implications for Educational Policy

The study's findings have significant implications for educational policy development in Thailand and similar developing country contexts. The demonstration that innovative pedagogical approaches can be successfully implemented in resource-constrained settings challenges assumptions about technology requirements for educational modernization and suggests that strategic investments in teacher preparation and pedagogical innovation may yield substantial returns (Siripongthon & Wannapiroon, 2022).

The cost-benefit analysis indicating positive returns on flipped classroom investment (estimated ฿125,000 annual benefit per ฿88,000 investment) provides empirical support for policy initiatives promoting educational innovation. These findings suggest that educational technology investments focused on pedagogical enhancement rather than infrastructure

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development may provide more effective approaches to educational improvement (Northeastern Education Development Center, 2023).

7.8 Limitations and Future Research Directions

Several limitations should be considered in interpreting these results. The quasi-experimental design without a control group limits causal inference capabilities, though the large effect sizes and consistency of improvements across multiple measures provide strong evidence for intervention effectiveness. The relatively short intervention period (seven weeks) prevents assessment of long-term retention and transfer effects, important considerations for sustainable educational improvement.

The single-subject focus (Buddhism education) and specific cultural context (northeastern Thailand) limit generalizability to other subjects and settings, though the theoretical foundations suggest potential applications across diverse religious and moral education contexts. Future research should investigate flipped classroom effectiveness across different subject areas, age groups, and cultural contexts to establish broader applicability.

The study's focus on academic achievement and engagement outcomes, while comprehensive, does not address potential impacts on spiritual development, moral reasoning, or behavioral change—important outcomes for religious education that may require longer observation periods and more sophisticated measurement approaches (Khon Kaen Provincial Education Office, 2022).

8. CONCLUSION

This quasi-experimental study provides compelling evidence for the effectiveness of flipped classroom implementation in Buddhism education among Grade 6 students in Khon Kaen Province, Thailand. The intervention produced substantial improvements in academic achievement (21.62 percentage point increase), student engagement (1.41 point increase on 5-point scale), and learning satisfaction (4.60/5.0 overall rating), while achieving efficiency ratios (88.85/83.30) that substantially exceed established educational effectiveness criteria.

The study's findings demonstrate that innovative pedagogical approaches can be successfully adapted to culturally specific educational contexts while maintaining respect for traditional values and practices. The flipped classroom model's emphasis on student-centered learning, active engagement, and practical application aligns naturally with Buddhist educational philosophy while addressing contemporary challenges related to student motivation and meaningful learning experiences.

The strong positive relationships observed between engagement, satisfaction, and achievement (r=0.68-0.81) support theoretical frameworks emphasizing the importance of emotional involvement and personal meaning-making in religious education. These findings suggest that effective Buddhism education must address both cognitive understanding and affective engagement, goals that the flipped classroom model achieves through its integration of self-paced content acquisition with interactive classroom application.

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Implementation feasibility analysis reveals that flipped classroom approaches are practical within Thai primary school contexts, with high participation rates (>90%) and successful technology integration despite modest infrastructure requirements. However, sustainable implementation requires comprehensive support including teacher professional development, ongoing technical assistance, and institutional commitment to pedagogical innovation.

The study contributes significantly to educational literature by providing empirical evidence for flipped classroom effectiveness in religious education contexts, particularly within developing country settings where such research remains limited. The findings extend theoretical understanding of constructivist learning applications while demonstrating practical strategies for educational modernization that preserve cultural authenticity.

Future research should investigate long-term retention effects, transfer to other subject areas, and optimal implementation strategies for diverse educational contexts. Additionally, examination of impacts on moral development, ethical reasoning, and spiritual growth would provide valuable insights into flipped classroom effectiveness for holistic religious education outcomes.

The integration of traditional Buddhist educational values with contemporary pedagogical innovation represented in this study offers a model for educational modernization that honors cultural heritage while meeting 21st-century learning demands. This approach provides hope for transforming religious education through evidence-based, culturally sensitive innovations that enhance both academic achievement and personal meaning-making.

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APPENDICES

Appendix A: Academic Achievement Test Items (Sample)

Buddhism Knowledge Assessment for Grade 6 Students

Instructions: Choose the best answer for each question. Mark your response clearly on the answer sheet.

1. The Buddha was born in which location? a) Bodhgaya, India b) Lumbini, Nepal c) Sarnath, India d) Kushinagar, India
2. The Four Noble Truths represent: a) The Buddha's first teaching b) The path to enlightenment c) The fundamental understanding of suffering and its cessation d) The rules for monastic life

[Sample continues with 38 additional items covering Buddhist history, teachings, ethics, and contemporary applications]

Knowledge Level Distribution:

- Remembering/Understanding: 16 items (40%)
- Applying/Analyzing: 14 items (35%)
- Evaluating/Creating: 10 items (25%)

Appendix B: Student Engagement Scale

Student Engagement in Buddhism Learning Scale

Instructions: Please rate how much you agree with each statement about your experience in Buddhism class. Use the following scale: 1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly Agree

Behavioral Engagement (Sample Items)

1. I actively participate in Buddhism class discussions.
2. I pay close attention during Buddhism lessons.
3. I complete all my Buddhism homework assignments.
4. I ask questions when I don't understand something in Buddhism class.
5. I take detailed notes during Buddhism lessons.

Emotional Engagement (Sample Items) 11. I feel excited about learning Buddhism. 12. I enjoy Buddhism class activities. 13. I feel proud when I understand Buddhist teachings. 14. I look forward to Buddhism lessons. 15. I feel connected to the Buddhist values we study.

Cognitive Engagement (Sample Items) 21. I think deeply about Buddhist teachings outside of class. 22. I connect Buddhist principles to my daily life experiences. 23. I use different strategies to understand complex Buddhist concepts. 24. I reflect on how Buddhist

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teachings apply to modern situations. 25. I make connections between different Buddhist concepts we study.

Appendix C: Statistical Analysis Tables

Table C1: Detailed Demographic Characteristics

Characteristic	**Category**	**Frequency**	**Percentage**
Gender	Male	68	49.6%
	Female	69	50.4%
Age	11 years	61	44.5%
	12 years	76	55.5%
Family Religion	Buddhist	122	89.1%
	Buddhist/Other	15	10.9%
Technology Access	Full access	129	94.2%
	Limited access	8	5.8%
Prior Buddhism Interest	Low	29	21.2%
	Moderate	65	47.4%
	High	43	31.4%

Table C2: Weekly Learning Activity Completion Rates

Activity Type	**Week 1**	**Week 2**	**Week 3**	**Week 4**	**Week 5**	**Week 6**	**Week 7**	**Average**
Video Lectures	89.1%	93.4%	95.6%	97.1%	98.5%	99.3%	99.3%	96.4%
Reading Assignments	84.7%	88.3%	91.2%	94.2%	95.6%	96.4%	97.8%	92.7%
Discussion Posts	78.1%	82.5%	85.4%	88.7%	91.2%	92.7%	94.2%	87.6%
Classroom Participation	95.6%	97.1%	98.5%	99.3%	99.3%	100%	100%	98.5%

Appendix D: Flipped Classroom Learning Materials Structure

Week 1: Introduction to Buddhism

Pre-class Materials:

- Video Lecture: "The Life of Buddha" (12 minutes)
- Reading Assignment: "Historical Context of Buddhism" (8 pages)
- Online Discussion: "Why do people seek spiritual understanding?"
- Preparation Questions: 5 reflection prompts

In-class Activities:

- Opening discussion: Key insights from pre-class learning (10 min)
- Small group activity: Comparing different spiritual traditions (20 min)
- Role-play: Buddha's early life decisions (15 min)
- Reflection writing: Personal connections to spiritual seeking (10 min)

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- Closing synthesis: Main learning points (5 min)

Assessment:

- Formative: Discussion participation rubric
- Summative: Reflection essay on spiritual development

[Structure continues for all 7 weeks covering: Buddhist Teachings, Four Noble Truths, Eightfold Path, Meditation Practices, Buddhist Ethics, and Contemporary Applications]

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The study adhered to international ethical standards for educational research involving minors, with appropriate institutional approvals and informed consent procedures. Data confidentiality and participant anonymity were maintained throughout all phases of the research process, reflecting commitment to responsible research practices in educational settings.