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THE FINK ACTIVE LEARNING MODEL FOR SCOUTING CONCEPT ACQUISITION AND RETENTION

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Abstract

Undergraduate scouting education in Iraq continues to rely predominantly on lecture-based instruction, and graduates frequently fail to retain scouting concepts beyond the examination period; moreover, few if any published experimental studies have examined the Fink Active Learning Model within scouting education or any physical education context. This study therefore investigated the effect of the Fink Active Learning Model on the acquisition and retention of scouting concepts among first-year undergraduate students in the Department of Physical Education and Sports Science, University of Zakho, Iraq (academic year 2024–2025). An experimental Equivalent-Groups Post-Test-Only Design with Controlled Observation was adopted. Thirty-six male first-year students were assigned, by lottery of intact class sections, to an experimental group ($n = 18$), taught through the Fink Active Learning Model, and a control group ($n = 18$), taught through the conventional method. Over a ten-week intervention comprising 20 teaching units, both groups studied identical scouting content, and learning was measured with a validated 45-item multiple-choice Scouting Concepts Test administered immediately after the intervention (acquisition) and again two weeks later (retention). Mann–Whitney U tests revealed statistically significant differences favouring the experimental group in both concept acquisition ($U = 68.5$, $z = -2.96$, $p = .003$, $r = .49$, medium effect) and retention ($U = 49.0$, $z = -3.58$, $p < .001$, $r = .60$, large effect); the experimental group's descriptive retention rate was also higher (93.52% vs. 88.80%). The findings extend the empirical evidence base of the Fink Model into scouting education and physical education, and support the value of structured, experiential, and dialogic active learning designs for promoting durable conceptual learning in these fields.

INTRODUCTION

Higher education in the twenty-first century is characterised by an unprecedented acceleration in the production and dissemination of knowledge, which has compelled institutions worldwide — including colleges of physical education and sports science — to shift away from teacher-centred, transmission-based pedagogies toward learner-centred, active approaches (Bonwell & Eison, 1991; Fink, 2003; Freeman et al., 2014). A large and methodologically diverse body of evidence indicates that such active approaches outperform conventional lecturing on measures of achievement, conceptual understanding, and long-term retention (Hake, 1998; Michael, 2006; Prince, 2004). In Iraq, this pedagogical imperative is particularly salient: many specialist programmes continue to rely on conventional lecture-based instruction despite evidence that passive methods produce inferior outcomes for concept retention and higher-order thinking (Bligh, 2000; Hussein, 2013).

Scouting Education (Al-Tarbiya Al-Kashfiyya) occupies a foundational role within Iraqi undergraduate physical education and sports science curricula, encompassing five thematic domains — the Scouting Movement, Ropes and Fire-Making, Scout Camps, Scout Formations, and Scouting Skills — and aiming to equip future practitioners with both the conceptual vocabulary and the practical competencies required to design, lead, and evaluate scouting activities. However, faculty members and scout leaders have repeatedly noted that graduates frequently fail to retain scouting concepts beyond the examination period, suggesting a systemic weakness in current instructional methods with respect to durable learning (Hussein, 2013). This observation aligns with a large body of empirical literature demonstrating that passive instructional methods produce weaker long-term retention than active, experiential approaches (Deslauriers & Wieman, 2011; Freeman et al., 2014; Tutal & Yazar, 2023).

The Fink Active Learning Model (Fink, 2003) offers a theoretically coherent and practically structured framework for addressing these challenges. The model holds that meaningful learning requires students to move dynamically between two complementary modes of engagement — Experience (Doing and Observing) and Dialogue (with Self and with Others) — and, for classroom implementation, it can be operationalised as a five-stage instructional sequence of Motivation, Teaching, Application, Assessment, and Repetition. A full theoretical treatment of the model, together with the cognitive mechanisms through which it is expected to support retention, is presented in the Theoretical Framework (Section 2).

Although the Fink Model has been applied with demonstrable success across several disciplines — including language education (Ali, 2024), religious and Islamic studies (Younis & Al-Saffawi, 2025), and creative writing instruction (Salem, 2026) — the authors located no published study that has examined its application within scouting education or, more broadly, within any physical education context. This absence cannot be established with certainty; however, searches of major databases (including Scopus, Web of Science, and ERIC) and of regional Arabic-language repositories returned no experimental study applying the Fink Model in these domains. The contribution of the present study is therefore twofold. Theoretically, it tests whether an experiential–dialogic active learning model transfers to a curriculum that uniquely combines a large conceptual vocabulary with embodied practical skill — the domain the model is, in principle, best suited to develop. Pedagogically, it provides controlled experimental evidence upon which the instruction of a compulsory core course in Iraqi physical education programmes can be redesigned.

The study addresses three interrelated objectives: (1) to determine whether the Fink Model produces statistically superior acquisition of scouting concepts compared with conventional instruction; (2) to examine whether any advantage in acquisition is maintained two weeks after instruction, as measured by a retention test; and (3) to compare the percentage retention rates of the two groups to assess the durability of learning across instructional conditions. Because active learning is a globally relevant reform agenda, evidence from Iraqi scouting education also speaks to a wider international audience: it offers a transferable test case of how experiential–dialogic design functions in a concept-and-skill curriculum, informing active learning scholarship, physical education pedagogy, and teacher preparation beyond the specific national context.

THEORETICAL FRAMEWORK

The Fink Active Learning Model: Origins and Foundations

L. Dee Fink, former Director of the Instructional Development Program at the University of Oklahoma, introduced his Model of Active Learning in the landmark text Creating Significant Learning Experiences (Fink, 2003). The model was developed in response to a dual challenge confronting higher education: the proliferation of knowledge renders content coverage as an exclusive pedagogical goal both unrealistic and insufficient, while evidence from cognitive science demonstrates that passive modes of learning — listening to lectures, reading textbooks, memorising definitions — produce fragile, context-dependent knowledge that is readily forgotten and difficult to transfer (Bligh, 2000; Vygotsky, 1978).

Fink's model conceptualises active learning as a dynamic interplay between two complementary experiential domains. The first domain, Experience, comprises (a) Doing, in which students directly perform the activities associated with the target skill or knowledge domain — building fires, tying knots, setting up camps, leading patrol formations; and (b) Observing, in which students gain vicarious experience by watching an expert or peer demonstrate the activity and critically analysing what they have witnessed. The second domain, Dialogue, contains (c) Dialogue with Self, encompassing structured reflection, journaling, self-assessment, and metacognitive monitoring; and (d) Dialogue with Others, including peer discussion, cooperative problem-solving, Socratic questioning, and reciprocal peer feedback. Fink (2003) emphasises that both modes of Experience and both modes of Dialogue must be present and systematically integrated for learning to be genuinely significant rather than merely superficial. This premise is consistent with experiential learning theory, in which knowledge is constructed through the transformation of concrete experience (Dewey, 1938; Kolb, 1984), and with discovery-oriented accounts of active knowledge construction (Bruner, 1961).

The model is also notable for its pedagogical holism: unlike purely cognitive frameworks, it explicitly acknowledges that learning occurs within a social and affective context. When students reflect on their own performance (Dialogue with Self), they regulate motivation and develop ownership over their learning; when they engage in Dialogue with Others, they construct shared meaning through language, compare mental models, and encounter productive cognitive conflict — mechanisms that Vygotsky (1978) identified as central to the development of higher psychological functions. The emphasis on progressively deeper modes of engagement also resonates with the ICAP framework, which predicts that interactive and constructive activities yield stronger learning than passive reception (Chi & Wylie, 2014). This resonance between Fink's model and social-constructivist accounts is more than coincidental: both argue that the most powerful learning occurs at the intersection of individual experience and social mediation.

The Five Procedural Steps of the Fink Model in Educational Practice

For the purposes of this study, the abstract components of the Fink Model were operationalised into five concrete instructional steps, drawing on the procedural framework described by Radi (2020) in his study of basketball skill learning:

Motivation. The lesson opens with a stimulus designed to activate students' prior knowledge and arouse curiosity about the new content — for example, posing a real-world problem ('You are leading a troop through unknown terrain at night; what knowledge and equipment do you need?') or showing a brief video of a scouting expedition. This stage corresponds primarily to Fink's Dialogue with Self and the Observing dimension of Experience.

Teaching. The instructor presents new scouting concepts using structured explanation, visual aids, and worked examples. Unlike a conventional lecture, this stage is punctuated by brief comprehension checks, targeted questions, and opportunities for students to verbalise their emerging understanding.

Application. Students work in cooperative groups to apply the newly presented concepts to authentic scouting tasks — constructing lashings, practising camp-layout procedures, demonstrating patrol formations. This stage is the primary site of the Doing dimension of

Experience and Dialogue with Others, and constitutes the most distinctively 'active' phase of the model.

Assessment. The instructor and peers provide formative feedback on group and individual performance (Bloom et al., 1971), and students engage in self-assessment using pre-distributed rubrics. This stage operationalises both Dialogue with Self and Dialogue with Others, and directly addresses one of the most persistent sources of forgetting — unresolved misconceptions that become embedded in long-term memory.

Repetition. The lesson concludes with a structured review in which key concepts are revisited, common errors are corrected, and connections between the new concepts and previously learned material are made explicit. This stage exploits the well-documented spacing and retrieval-practice effects: revisiting and retrieving information at the end of a session strengthens its subsequent accessibility in long-term memory (Cepeda et al., 2006; Roediger & Karpicke, 2006).

Concept Acquisition: Theoretical and Operational Definitions

In the educational-psychology literature, concept acquisition is distinguished from mere factual recall by its emphasis on relational understanding: a learner who has acquired a concept can not only define it (Recall), but can also discriminate instances of the concept from non-instances (Discrimination) and deploy it correctly in novel situations (Application) (Anderson & Krathwohl, 2001). This tripartite structure maps directly onto the three cognitive levels used to construct the Scouting Concepts Test in the present study.

From a constructivist perspective, concept acquisition is an active process of knowledge construction in which new information is assimilated into existing conceptual schemas or, where necessary, accommodates existing schemas (Vygotsky, 1978). The quality of acquisition therefore depends not only on the amount of information presented but on the richness and depth of the cognitive processing that occurs during learning — precisely what the Fink Model is designed to maximise through its systematic cycling between experience and dialogue (Chi & Wylie, 2014). Operationally, concept acquisition was assessed using a post-test administered one day after the conclusion of the ten-week intervention, measuring students' ability to recall definitions of scouting concepts, distinguish between related but distinct concepts, and apply conceptual knowledge to realistic scouting scenarios.

Learning Retention: Mechanisms and Educational Significance

Retention — the ability to store acquired knowledge in memory and subsequently retrieve it — is widely regarded as a critical measure of instructional effectiveness (Deslauriers & Wieman, 2011). Acquisition scores, measured immediately after instruction, are susceptible to short-term priming and recency effects; retention scores, measured after a delay, provide a more accurate estimate of what has been integrated into more durable memory structures. It should be noted at the outset that the present study measured retention over a two-week interval, which indexes short-term durability rather than long-term retention over professionally relevant time scales.

The cognitive mechanisms underlying retention are closely tied to elaborative encoding and retrieval practice. Elaborative encoding occurs when learners connect new information to existing knowledge through multiple cognitive operations — comparison, application, self-explanation, discussion — creating a denser network of associative memory traces that are more resistant to forgetting (Dunlosky et al., 2013; Vygotsky, 1978). Retrieval practice — the act of actively recalling information from memory rather than merely re-reading it — has been shown repeatedly to produce a 'testing effect' that strengthens retention independently of study time (Karpicke & Blunt, 2011; Karpicke & Roediger, 2008; Roediger & Butler, 2011). Both mechanisms are inherent features of the Fink Model: the Application and Repetition stages require students to retrieve and deploy newly acquired concepts in each lesson, thereby consolidating memory traces through repeated, distributed retrieval. Retention is particularly important in scouting education, where practitioners must recall concepts and apply them flexibly in real-world, often high-pressure outdoor environments; only knowledge that is retained and transferable has lasting professional value.

Scouting Education in Iraqi Higher Education

The Scouting Movement was established by Lord Robert Baden-Powell, who conducted the first experimental scout camp on Brownsea Island, England, in 1907. Following the publication of Scouting for Boys in 1908 and the formalisation of the World Organization of the Scout Movement (WOSM), scouting spread globally as a voluntary, non-political, educational movement open to all people regardless of origin, race, or creed (WOSM, 2020). In Iraq, organised scouting began in 1925 with the establishment of the first training camp for teachers at Al-Jadiriyya, Baghdad, and the Iraqi Scout Association has since been affiliated with WOSM.

Within Iraqi colleges of physical education and sports science, Scouting Education is a compulsory second-semester course for first-year students. Its curriculum encompasses five thematic units: (1) The Scouting Movement — history, philosophy, the three fundamental principles, and organisational structures; (2) Ropes and Fire-Making — types of ropes and their properties, knot-tying techniques, and the construction of different fire types; (3) Scout Camps — site selection, camp layout, inspection procedures, and camp types; (4) Scout Formations — patrol organisation, leadership roles, and patrol activities; and (5) Scouting Skills — directional-orientation methods, use of the scout staff, and scout salutes, handshakes, and signs. Despite the breadth and practical relevance of this curriculum, published empirical research on its teaching methodology is remarkably scarce: Hussein (2013) documented widespread dissatisfaction among Iraqi scout leaders and faculty with existing instructional approaches, finding that conventional methods failed to generate meaningful engagement or sustained retention. The present study represents, to the authors' knowledge, one of the first controlled experimental investigations of an alternative instructional model within this curriculum.

REVIEW OF RELATED STUDIES

Although the authors located no prior study examining the Fink Model in a scouting or physical education context, a coherent body of research demonstrates its effectiveness across several other disciplines, set against a broader evidence base for active learning. The studies reviewed below were selected on the basis of methodological rigour, disciplinary relevance, and recency, and are read against wider syntheses showing that active, interactive methods reliably outperform lecturing (Hake, 1998; Michael, 2006; Prince, 2004).

Ali (2024): Arabic Grammar Acquisition and Attitudes

Ali (2024) examined the effect of the Fink Model on the achievement of Arabic grammar rules and attitudes toward learning among 60 female students in the second intermediate grade in Diyala Governorate, Iraq. Using a quasi-experimental two-group design with a 30-item achievement test and a 28-item attitude scale, the study found statistically significant differences favouring the experimental group on both achievement and attitude ($p < .05$), attributed to the model's capacity to make grammar instruction more interactive, contextually embedded, and personally meaningful. This study is relevant because grammar, like scouting, requires students to master a large vocabulary of conceptual distinctions and to apply abstract rules in concrete contexts.

Younis and Al-Saffawi (2025): Quranic and Islamic Education

Younis and Al-Saffawi (2025) investigated the effect of the Fink Model on the cognitive achievement of 80 fourth-scientific-grade students in Quranic and Islamic Education, using a quasi-experimental two-group design and a 24-item cognitive achievement test. The experimental group significantly outperformed the control group ($p < .05$). The authors noted that the dialogue and application stages were particularly effective in helping students connect abstract principles to concrete real-life situations — a mechanism that parallels the way the Fink Model is expected to connect abstract scouting concepts to authentic outdoor contexts.

Salem (2026): Creative Writing Skills in Teacher Education

Salem (2026) evaluated an integrated programme combining the Fink Model with graduated activities in developing creative writing skills among 40 third-year female students at Al-Azhar University, Egypt. Using a single-group pre–post design with a 21-skill checklist and a creative-writing test, the programme produced significant improvement on all 21 skills. The study demonstrates that the Fink Model is effective not only in conceptual or declarative knowledge domains but also in skill-based domains involving complex, multi-component competencies.

Freeman et al. (2014): Meta-Analytic Evidence for Active Learning

Freeman and colleagues (2014) conducted a landmark meta-analysis of 225 studies comparing student performance under active learning versus traditional lecturing in undergraduate STEM courses. Active learning produced an average performance gain equivalent to 0.47 standard deviations on examination scores, and students in conventionally taught classes were 1.5 times more likely to fail. These effects held across disciplines and class sizes, though they were largest in small classes ($n \leq 50$) — precisely the sample-size range of the present study. This synthesis complements earlier reviews reporting broad support for active, collaborative, and problem-based methods (Prince, 2004).

Deslauriers and Wieman (2011): Active Learning and Concept Retention

Deslauriers and Wieman (2011) compared the mastery and long-term retention of quantum-mechanics concepts among two equivalent cohorts of university physics students. The cohort receiving interactive-engagement instruction scored 19% higher on a conceptual survey than the cohort taught by a highly rated traditional lecturer, and this absolute advantage was fully preserved when students were re-tested 6 and 18 months later. The authors concluded that interactive engagement produces conceptual understanding that is both deeper and more durable than lecture-based instruction — a finding directly relevant to the present study's retention hypothesis.

Critical Synthesis and Research Gap

Read together, these studies converge on four findings: (1) the Fink Model — and active learning more broadly — consistently produces statistically significant performance advantages over conventional instruction (Michael, 2006; Prince, 2004); (2) these advantages are observed across diverse disciplines, age groups, and educational levels; (3) active learning produces deeper and more durable retention of conceptual knowledge; and (4) the advantages are particularly pronounced for complex content domains requiring both declarative and procedural knowledge, including cooperative and problem-based designs (Hmelo-Silver, 2004; Johnson & Johnson, 2009; Prince & Felder, 2006). Recent meta-analytic evidence reinforces this picture: Tutal and Yazar (2023) found large positive effects of active learning on both achievement ($g = 1.005$) and learning retention ($g = 1.204$) relative to teacher-led instruction.

A critical reading, however, also exposes important limitations. Several Fink Model studies rely on quasi-experimental assignment (Ali, 2024; Younis & Al-Saffawi, 2025) or single-group pre–post designs without a control condition (Salem, 2026), which weakens causal inference. Retention — arguably the most professionally meaningful outcome — is rarely measured in the Fink Model literature; only the broader active learning literature (Deslauriers & Wieman, 2011; Tutal & Yazar, 2023) provides retention evidence, and effect sizes there vary considerably by subject domain and educational level. Moreover, active learning research within physical education has concentrated on practical motor skills or general cognitive outcomes such as critical thinking (Hidayat et al., 2023; Radi, 2020) rather than on domain-specific conceptual knowledge and its retention. The present study addresses this gap directly, using an experimental design with random (section-level) assignment and a delayed retention measure.

METHODOLOGY

Research Design

The study employed an experimental approach — a rigorous design for establishing causal relationships between instructional interventions and student outcomes in educational research (Ubaidat et al., 2020). Specifically, the Equivalent-Groups Post-Test-Only Design with Controlled Observation was selected (Jerry & Jack, 2005). This design avoids the pre-testing sensitisation effects that can inflate experimental-group performance and is appropriate when participants can be randomly assigned to conditions. In the present study, randomisation was performed at the level of the two intact class sections rather than at the level of the individual student: the two existing sections of the first-year cohort were randomly allocated to experimental and control roles by lottery. The design therefore constitutes a section-level (cluster) allocation; this feature is revisited in the Limitations. The experimental group received the independent variable (the Fink Model), while the control group received conventional instruction. Both groups were assessed on the same dependent variables — scouting concept acquisition (post-test) and retention (retention test two weeks later) — using identical instruments under identical conditions (Table 1).

Table 1. Experimental Design Structure

Group	Independent Variable	Post-Test (Acquisition)	Retention Test
Experimental	Fink Model	Scouting Concepts Test	Scouting Concepts Test (2 weeks later)
Control	Conventional Method	Scouting Concepts Test	Scouting Concepts Test (2 weeks later)

Research Population and Sample

The target population comprised all 148 male first-year students enrolled in the Department of Physical Education and Sports Science at two Iraqi universities during the academic year 2024–2025: the University of Zakho and the College of Physical Education and Sports Science at the University of Duhok. Female students were excluded from both samples to ensure gender homogeneity across groups, as gender has been identified as a potential moderator of instructional-method effects in physical education research. This exclusion necessarily limits the generalisability of the findings to male students and is acknowledged as a limitation (Section 6.6).

For instrument construction, a purposive sample of 98 students from the University of Duhok was initially selected. Ten students who participated in the pilot administration were subsequently excluded from the construction sample to prevent contamination of item statistics, and 24 female students were excluded, yielding a final construction sample of 64 male students. This sample served exclusively for item analysis and psychometric evaluation of the Scouting Concepts Test; none of these students participated in the intervention. For the intervention, 50 students were initially enrolled from the University of Zakho; four were excluded due to repeated absences (more than two consecutive sessions) and ten female students were excluded, yielding a final application sample of 36 male students. Using a random lottery procedure conducted in the presence of the department head, Section B (n = 18) was assigned as the experimental group and Section A (n = 18) as the control group. The participant flow is summarised in Table 2: of 50 enrolled, 14 were excluded (10 female + 4 for absences), leaving 36 analysed (18 + 18), with no post-allocation attrition.

Table 2. Participant Flow and Distribution of the Application Sample by Group

Group	Teaching Method	Section	Enrolled	Excluded	Analysed
Experimental	Fink Model	B	22	4	18
Control	Conventional Method	A	20	2	18
Total	—	—	**42**	**6**	**36**

Note. Enrolled/Excluded/Analysed figures refer to the intervention (application) sample after the prior removal of 10 female students and 4 students with excessive absences from the original 50 enrolled at the University of Zakho. Section-level lottery determined group assignment.

Control of Extraneous Variables

All participants were first-year students admitted under identical entry criteria (including age requirements and fitness standards) and were therefore at the same developmental stage; control for maturation was further ensured by the comparatively short intervention duration (10 weeks). Students with more than two consecutive unexplained absences were excluded before the intervention commenced to ensure that all retained participants received an adequate and comparable dose of the intervention — that is, exposure to the great majority of the 20 teaching units — thereby reducing the risk of differential attrition and unequal treatment exposure. A single, standardised version of the 45-item Scouting Concepts Test was administered to both groups simultaneously under identical examination conditions: both groups took the post-test on 21 May 2025 and the retention test on 4 June 2025. Both groups received equal instructional time — two 90-minute sessions per week, with counterbalanced scheduling to control for time-of-day effects — and the same subject-matter instructor taught both groups throughout, eliminating instructor effects as a confound.

To support intervention fidelity across the ten-week period, the same instructor delivered all sessions from detailed written lesson plans, and adherence to the five-stage Fink sequence and its per-stage time allocations — established during the pilot lesson — was monitored against those plans throughout the intervention, so that each experimental session followed the prescribed Motivation–Teaching–Application–Assessment–Repetition structure and timing.

Development and Validation of the Scouting Concepts Test

Because no validated instrument for measuring scouting concept acquisition was available in the extant literature, the researchers developed a bespoke 45-item multiple-choice Scouting Concepts Test through a rigorous five-stage process. First, the instructional content of the five thematic units was systematically analysed, identifying 40 scouting concepts, from which 15 were selected as primary conceptual targets based on their centrality to the curriculum, frequency of recurrence, and importance for professional practice. For each target concept, three behavioural objectives were formulated — one at each of three cognitive levels derived from Anderson and Krathwohl's (2001) revision of Bloom's taxonomy: Recall, Discrimination, and Application — yielding 45 objectives and 45 items equally distributed across levels. A test blueprint (Table 3) ensured that item distribution reflected the relative content weight of each thematic unit.

Table 3. Test Blueprint — Distribution of Items Across Thematic Units and Cognitive Levels

Thematic Unit	Concepts (n)	Weight (%)	Recall	Discrimination	Application	Total
Scouting Movement	13	32.5	5	5	5	15
Ropes & Fire-Making	10	25.0	4	4	4	12
Scout Camps	2	5.0	1	1	1	3
Scout Formations	9	22.5	3	3	3	9
Scouting Skills	6	15.0	2	2	2	6
Total	**40**	**100**	**15**	**15**	**15**	**45**

The complete test was submitted to a panel of five subject-matter experts comprising specialists in physical education pedagogy, scouting leadership, and educational measurement, who judged each item on content representativeness and linguistic clarity; the retention criterion was 80% or higher expert agreement (i.e., at least four of the five experts), which all 45 items met or exceeded after minor wording revisions. The validated instrument was piloted on the construction sample (n = 64) at the University of Duhok on 12 May 2025 (administration time 35–45 minutes; mean = 40 minutes). Item analysis revealed difficulty indices ranging from 0.46 to 0.78 and discrimination indices from 0.26 to 0.70, all meeting acceptable psychometric standards (Murad & Suleiman, 2005), and internal-consistency reliability calculated using Kuder–Richardson Formula 20 (Kuder & Richardson, 1937) was 0.81, indicating good internal consistency (Table 4).

Table 4. Summary of Item-Analysis Statistics for the Scouting Concepts Test

Psychometric Property	Range / Value	Acceptable Criterion	Verdict
Difficulty Index (P)	0.46 – 0.78	0.20 – 0.80	All acceptable
Discrimination Index (D)	0.26 – 0.70	≥ 0.25	All acceptable
Distractor Effectiveness	All negative	Negative value	All acceptable
KR-20 Reliability	0.81	≥ 0.70	Good

Instructional Plans and Pilot Lesson

The research team prepared complete written instructional plans for all 20 teaching units: ten plans structured according to the Fink Model's five stages (experimental group) and ten parallel plans structured as conventional lessons using direct instruction and question-and-answer (control group). The experimental plans specified the duration, activities, materials, and assessment strategies for each of the five stages within each 90-minute session. Both sets of plans were reviewed by a panel of specialists in physical education pedagogy and scouting education, who confirmed their content accuracy and pedagogical coherence after minor revisions. A single pilot lesson on Scout Formations was delivered to the experimental group on 27 February 2025 to confirm the instructor's competence in applying the model, the feasibility of the five-stage structure within a 90-minute session, and the allocation of time to each stage; time allocations required only minor adjustments (Motivation 10 min; Teaching 25 min; Application 35 min; Assessment 12 min; Repetition 8 min), which were incorporated into all subsequent lessons.

Experimental Procedure and Timeline

The intervention commenced on 2 March 2025 and concluded on 20 May 2025, spanning ten instructional weeks (excluding the official holiday period from 20 March to 5 April 2025). Both groups received 20 teaching units, two per week, in the indoor hall of the Department of Physical Education and Sports Science, University of Zakho, under standard environmental conditions. The post-test was administered to both groups on 21 May 2025 — the day after the intervention concluded — under standard examination conditions. Both groups were informed in advance that the post-test would contribute to their semester grade, which helped ensure genuine effort; this condition applied identically to both groups. The retention test (an identical form of the same instrument) was administered two weeks later, on 4 June 2025, without prior warning to either group, to prevent confounding by targeted revision. Because an identical instrument was used for both administrations, several steps were taken to minimise test-familiarity effects: test papers were collected after the post-test, no answer key or item-level feedback was released between the two administrations, and the unannounced timing of the retention test prevented deliberate rehearsal of test content.

Ethical Considerations

The study was conducted with the official approval of the Department of Physical Education and Sports Science and the College of Education at the University of Zakho, and with the corresponding approval of the University of Duhok for the instrument-development phase. All students were informed of the purpose and procedures of the study, and participation was voluntary; students were free to withdraw at any time without academic penalty. Data were collected and stored anonymously, individual scores were treated confidentially, and results are reported only in aggregate form. The control group was not educationally disadvantaged: it received the complete standard curriculum, taught by the same instructor, with identical content coverage and instructional time. In line with departmental assessment regulations, the post-test also served as part of the semester assessment; because this condition was announced in advance and applied identically to both groups, grade-related motivation was held constant across conditions, while the retention test was unannounced and did not contribute to grades.

Statistical Analysis

Data were analysed using Microsoft Excel 2019. The Mann–Whitney U test was employed as a non-parametric test appropriate for comparing two independent groups. Given the small per-group sample size ($n = 18$), the assumption of normality could not be reliably verified; the non-parametric Mann–Whitney U test was therefore selected a priori as a conservative choice appropriate for small, potentially non-normal distributions, rather than relying on a formal normality test whose power is limited at this sample size. All U computations were performed in Excel using rank-based procedures and were verified against standard critical-value tables for the Mann–Whitney U statistic. A calculated U value smaller than the critical tabled value (at $\alpha = .05$, two-tailed, $n_1 = n_2 = 18$: U-critical = 109) indicates a statistically significant group difference. The standardised statistic z was obtained from the normal approximation of U, and the effect size r was calculated as $r = |z| / \sqrt{N}$, where N is the total sample size ($N = 36$); following Cohen (1988), r is interpreted as small ($\geq .10$), medium ($\geq .30$), and large ($\geq .50$). The retention rate was calculated descriptively as (retention mean ÷ acquisition mean) × 100.

RESULTS AND DISCSSION

RESULTS

Because the post-test and the retention test used the same instrument and the same maximum score (45 points), the acquisition and retention means reported below are on a common scale and are directly comparable both between groups and across the two administrations.

Hypothesis 1 — Acquisition of Scouting Concepts

The first null hypothesis ($H0_1$) stated: 'There is no statistically significant difference ($p \leq .05$) between the mean ranks of the experimental group (Fink Model) and the control group (conventional method) on the post-test measure of scouting concept acquisition.' Table 5 presents the descriptive statistics, Mann–Whitney U results, and effect size for acquisition.

Table 5. Mann–Whitney U Results and Effect Size for Scouting Concept Acquisition (Post-Test)

Group	n	Mean	Sum of Ranks	Mean Rank	U (Calc.)	z	p	r
Experimental	18	35.16	426.5	23.69	68.5	−2.96	.003	.49
Control	18	30.27	239.5	13.31	—	—	—	—

Note. N = 36 (n = 18 per group). Mean = mean score out of 45. U = Mann–Whitney U statistic; z = standardised statistic from the normal approximation of U; $r = |z|/\sqrt{N}$. *U-critical = 109 (*$\alpha = .05$*, two-tailed,* $n_1 = n_2 = 18$*). Effect-size benchmarks (Cohen, 1988): r = .10 small, r = .30 medium, r = .50 large.*

The calculated U value (68.5) is substantially lower than the critical value (109), and the associated p-value (.003) is below the significance threshold; $H0_1$ was therefore rejected.

The experimental group's mean score (35.16 of 45) exceeded that of the control group (30.27) by 4.89 points, and its mean rank (23.69) exceeded the control group's (13.31). The effect size (r = .49) falls in the medium range according to Cohen's (1988) criteria.

Hypothesis 2 — Retention of Scouting Concepts

The second null hypothesis ($H0_2$) stated: 'There is no statistically significant difference ($p \leq .05$) between the mean ranks of the experimental and control groups on the retention test administered two weeks after the post-test.' Table 6 presents the retention results.

Table 6. Mann–Whitney U Results and Effect Size for Scouting Concept Retention (Retention Test)

Group	n	Mean	Sum of Ranks	Mean Rank	U (Calc.)	z	p	r
Experimental	18	32.88	446.0	24.78	49.0	−3.58	< .001	.60
Control	18	26.88	220.0	12.22				

Note. N = 36 (n = 18 per group). Mean = mean score out of 45. U = Mann–Whitney U statistic; z = standardised statistic from the normal approximation of U; $r = |z|/\sqrt{N}$. U-critical = 109 ($\alpha = .05$, two-tailed, $n_1 = n_2 = 18$). Effect-size benchmarks (Cohen, 1988): r = .10 small, r = .30 medium, r = .50 large.

The calculated U value (49.0) is substantially lower than the critical value (109), and the associated p-value (< .001) is statistically significant; $H0_2$ was therefore rejected. The experimental group retained a mean score of 32.88, compared with 26.88 for the control group — a difference of 6.00 points. The effect size for retention (r = .60) reaches the large-effect threshold (Cohen, 1988) and is larger than the effect size for acquisition (r = .49).

Objective 3 — Comparative Retention Rates

Table 7 presents the acquisition means, retention means, and calculated retention rates for both groups. As noted in Section 4.8, the retention rate is a descriptive index and was not subjected to inferential testing.

Table 7. Comparative Acquisition Means, Retention Means, and Retention Rates

Group	Acquisition Mean (Post-Test)	Retention Mean (Retention Test)	Retention Rate (%)
Experimental	35.16	32.88	93.52
Control	30.27	26.88	88.80
Difference (Exp − Ctrl)	**+4.89**	**+6.00**	**+4.72**

Note. Retention rate = (retention mean ÷ acquisition mean) × 100. Because both tests share the same 45-point scale, means are directly comparable. The retention-rate difference is reported descriptively only and was not tested inferentially.

Both groups retained a high proportion of acquired knowledge over the two-week interval. Descriptively, the experimental group's retention rate (93.52%) was higher than the control group's (88.80%), a difference of 4.72 percentage points. Because this ratio was not subjected to inferential testing, the difference is reported descriptively and should be interpreted with appropriate caution.

Summary of Hypothesis Decisions

On the basis of the inferential tests, both null hypotheses were rejected: $H0_1$ (acquisition), U = 68.5, z = −2.96, p = .003, r = .49; and $H0_2$ (retention), U = 49.0, z = −3.58, p < .001, r = .60. The experimental group thus showed a statistically significant advantage on both outcomes, with a medium effect for acquisition and a large effect for retention. The third objective, concerning comparative retention rates, was addressed descriptively: the experimental group's retention rate was higher than the control group's, but this comparison was not tested inferentially.

DISCUSSION

Interpretation of the Key Findings

This study set out to determine whether the Fink Active Learning Model improves the acquisition and retention of scouting concepts relative to conventional instruction. The results provide affirmative evidence. Students taught through the Fink Model significantly outperformed their conventionally taught peers on the immediate post-test (medium effect) and on the delayed retention test (large effect). They also preserved a descriptively higher proportion of their acquired knowledge over the two-week interval. Notably, the model's advantage did not merely survive the retention interval; it increased, both in raw-score difference (from 4.89 to 6.00 points) and in effect size (from $r = .49$ to $r = .60$). This pattern suggests that the Fink Model does not simply elevate immediate performance through transient engagement or motivation effects. Rather, it appears to foster deeper encoding that is more resistant to forgetting over this short interval. Because retention was measured only two weeks after instruction, however, these results speak to short-term durability; claims about long-term retention over months or years would require longer follow-up.

Comparison with Previous Studies

The acquisition findings are consistent with the small but growing Fink Model literature. They replicate, in a new disciplinary domain, the achievement advantages reported by Ali (2024) in Arabic grammar and by Younis and Al-Saffawi (2025) in Quranic and Islamic education, and they align with Salem's (2026) evidence that the model can develop complex, multi-component competencies. They also cohere with Radi's (2020) finding that designs incorporating the Fink Model support learning in a sport-skill context, and with broader evidence that active methodologies enhance cognitive outcomes in physical education (Hidayat et al., 2023) and across disciplines more generally (Michael, 2006; Prince, 2004).

The retention findings extend this literature. Most prior Fink Model studies measured only immediate achievement; the present study shows that the model's advantage persists — and, over this interval, strengthens — after a delay. This pattern mirrors Deslauriers and Wieman's (2011) finding that the advantage of interactive engagement is preserved across retention intervals, and it is consistent with meta-analytic evidence that active learning exerts an even larger effect on retention than on immediate achievement (Tutal & Yazar, 2023). At the same time, both groups retained a high proportion of acquired knowledge (above 88%), congruent with the observation that conceptual knowledge, once genuinely acquired, decays slowly over short intervals (Deslauriers & Wieman, 2011). The present study therefore supports and extends prior active learning research rather than contradicting it: its distinctive contribution is to demonstrate that the established pattern holds in a domain — scouting education — that had not previously been examined.

Why the Fink Model Supported Acquisition and Retention

Several mechanisms embedded in the model's five-stage structure plausibly account for the observed advantages, and each links directly to a specific result. The Motivation stage created affective and cognitive readiness by activating prior knowledge and establishing the real-world relevance of each lesson's concepts. The Application stage required students to use newly acquired concepts in cooperative, hands-on scouting tasks, producing the elaborative encoding — comparison, application, self-explanation, and discussion — that builds dense associative memory networks (Ambrose et al., 2010; Dunlosky et al., 2013). The formative Assessment stage addressed one of the primary mechanisms of forgetting by surfacing and correcting misconceptions before they became embedded in memory (Bloom et al., 1971).

The amplification of the model's advantage from acquisition to retention can be attributed particularly to the Repetition and Application stages. The Repetition stage at the end of each lesson constitutes structured retrieval practice: students recall and re-express key concepts from memory at the close of each session, exploiting the testing effect, whereby active retrieval strengthens retention more than restudy (Karpicke & Roediger, 2008; Roediger & Butler, 2011; Roediger & Karpicke, 2006). In addition, the cooperative Application activities created interleaved practice, in which students applied multiple related concepts within the same task — a condition associated with stronger retention than blocked practice (Cepeda et al., 2006). By contrast, conventional instruction offered comparatively few structured opportunities for retrieval, elaboration, or feedback, which is consistent with the control group's lower retention.

Theoretical Contribution

Theoretically, the study extends the Fink Model beyond the language, religious, and writing domains in which it had been tested, into a curriculum that combines a large conceptual vocabulary with embodied practical skill. The results support the model's core proposition — that significant learning arises from the systematic integration of Experience (Doing and Observing) and Dialogue (with Self and with Others) (Fink, 2003) — in a domain where both dimensions can operate simultaneously and authentically. The findings are also consistent with social-constructivist accounts of learning as socially mediated knowledge construction (Vygotsky, 1978) and with engagement frameworks that predict stronger learning from interactive and constructive activity (Chi & Wylie, 2014): the largest gains appeared precisely where the design maximised social interaction, articulation, and guided practice. Methodologically, the study's contribution rests on two features that distinguish it within the Fink Model literature — a controlled experimental design and a delayed retention measure — which together allow the durability of the effect, not merely its immediate presence, to be estimated.

Pedagogical Implications

For physical education and sports science programmes, the findings suggest that scouting instruction — traditionally delivered through lectures — can be meaningfully improved by structuring lessons around the five-stage Fink sequence. The model proved feasible within standard 90-minute sessions using ordinary departmental facilities, required no special technology, and was implemented by a single instructor after a short pilot, indicating that adoption costs are modest. Because the model's strongest advantage concerned retention, it appears especially suited to courses whose knowledge must remain accessible after examinations — as is the case for scouting concepts that graduates will apply in professional practice. Teacher-preparation programmes may accordingly familiarise prospective physical education instructors with the design of Motivation, Application, Assessment, and Repetition activities, and with formative feedback and retrieval-based review more generally (Prince & Felder, 2006).

Limitations and Future Research

The findings should be interpreted in light of several limitations. The sample was small (n = 36), exclusively male, and drawn from a single institution, which constrains statistical power and generalisability; because randomisation was performed at the section level rather than the individual level, individual-level exchangeability cannot be assumed. The retention interval was short (two weeks), leaving open the question of durability over professionally relevant time scales. The outcome measure captured conceptual knowledge only, not practical scouting skill; and, although the same instructor taught both groups, complete blinding of the instructor to group condition was not possible. Finally, because the same instrument was used for both the acquisition and retention tests, some test-familiarity influence cannot be entirely excluded, notwithstanding the safeguards described in Section 4.6. Future research should replicate the study with larger and mixed-gender samples across multiple institutions, extend the retention interval to a semester or beyond, incorporate performance-based assessments of practical scouting skills, and compare the Fink Model directly with other structured active learning frameworks such as Problem-Based Learning, Team-Based Learning, the Flipped Classroom, and Cooperative Learning (Hmelo-Silver, 2004; Johnson & Johnson, 2009).

CONCLUSIONS

This study asked whether the Fink Active Learning Model is more effective than conventional instruction in developing first-year physical education students' acquisition and retention of scouting concepts. The answer is affirmative: students taught through the Fink Model significantly outperformed conventionally taught students on both the immediate post-test and the two-week retention test, with a medium effect for acquisition and a large effect for retention, and they preserved a higher proportion of their acquired knowledge (93.52% versus 88.80%).

The most distinctive pattern in the results is that the model's advantage was larger at the retention stage than at the acquisition stage, suggesting that its principal pedagogical value lies in promoting durable, retrievable learning rather than merely boosting immediate test performance. To the authors' knowledge, this study is among the first controlled experimental investigations of the Fink Model within scouting education or any physical education context, thereby extending the model's evidence base into a new disciplinary domain. Practically, the findings support the use of active, experiential, and dialogic instructional design — structured around motivation, application, formative assessment, and retrieval-based review — in scouting courses and comparable concept-rich subjects. These conclusions must be tempered by the study's limitations, notably the small, male-only, single-institution sample and the short retention interval. Read alongside the wider international evidence base for active learning, however, the results make a clear case that experiential–dialogic design deserves a central place in the redesign of scouting instruction — and invite the longitudinal, multi-site, skill-inclusive research needed to establish how far its benefits extend.

RECOMMENDATIONS

1. Instructors responsible for Scouting Education in physical education and sports science programmes may consider integrating the Fink Active Learning Model as an alternative or complementary instructional framework, given the favourable evidence for both concept acquisition and retention obtained in this study.
2. Where the model is adopted, departments are encouraged to support instructors with structured preparation in the five-stage procedure — Motivation, Teaching, Application, Assessment, and Repetition — through workshops, peer observation, or mentored practice, since fidelity of implementation is likely to condition the model's effectiveness.
3. Curriculum developers may explore, on a course-by-course basis and subject to further evidence, whether other subjects with large conceptual vocabularies and practical applications could benefit from the Fink Model or similar active learning frameworks.
4. The Scouting Concepts Test developed in this study showed sound psychometric properties within its development context; it may be further validated — with larger, more diverse samples, including female students and other institutions — before any broader adoption in the theoretical assessment of Scouting Education.
5. Educational institutions are encouraged to weigh evidence-based active learning models alongside conventional lecturing when reviewing instructional policy, in line with the international evidence base (Freeman et al., 2014; Tutal & Yazar, 2023), while recognising that the present findings derive from a small, single-site experiment and should inform — rather than dictate — such decisions.

DIRECTIONS FOR FUTURE RESEARCH

Building on the limitations identified above, four avenues appear most productive. First, longitudinal studies should examine the durability of scouting concept knowledge at extended intervals — one semester, one academic year, and beyond — to determine whether the Fink Model's retention advantage persists over professionally relevant time scales. Second, the model should be tested in other specialist physical education courses (e.g., first aid, outdoor and adventure education, sport history) and compared directly with alternative active learning frameworks such as Problem-Based Learning, Team-Based Learning, the Flipped Classroom, and Cooperative Learning. Third, studies incorporating female and mixed-gender samples across multiple Iraqi universities are needed to examine potential gender moderation and to establish generalisability across institutional contexts. Fourth, future work should extend the outcome space from conceptual knowledge to practical scouting skills, using performance-based assessments of students' ability to execute roping techniques, fire-building procedures, camp layout, and patrol leadership.

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Author Contribution Statement

A.N.N. conceived and designed the study, developed the Fink Model-based instructional materials, and led the drafting of the manuscript. R.M.S.S. coordinated participant recruitment and section randomization, delivered the experimental and control interventions, and administered the Scouting Concepts Test. M.M.M. conducted the statistical analysis and interpretation of the acquisition and retention data and critically revised the manuscript for intellectual content. All authors read, critically reviewed, and approved the final version of the manuscript and agree to be accountable for all aspects of the work.

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