



Managing National Science Olympiad Coaching: A Case Study of Internal–External Collaboration at SMA Negeri 2 Ponorogo

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ABSTRACT

Purpose: Academic achievement in the National Science Olympiad (OSN) is determined not only by individual student ability but also by how schools manage their coaching programs. This study examines the management of the OSN coaching program at SMA Negeri 2 Ponorogo, using Terry's management functions, planning, organizing, implementing, and controlling as an analytical framework. **Methods:** This qualitative case study collected data through in-depth interviews with the principal, the vice-principal for student affairs, and three supervising teachers in informatics, chemistry, and economics. Observation and document analysis complemented the interviews. The data were analyzed using an interactive model and validated through source triangulation. **Findings:** The findings indicate that the school implemented all four management functions: planning through annual programs and syllabus-based materials; organizing through a coaching team and partnerships with external Olympiad tutoring institutions; implementation through intensified, routine, and Higher-Order Thinking Skills (HOTS)-based coaching; and controlling through periodic tests, mock examinations, and re-teaching sessions. The number of students qualifying for the provincial level increased from four in 2025 to seven in 2026, a change that was observed alongside the adoption of an internal-external collaborative coaching model, rather than being directly attributable to it. **Research Implications:** The findings suggest that schools can strengthen student achievement in academic competitions by developing a well-managed collaborative coaching structure that integrates the expertise of school teachers with external experts. **Originality:** This study contributes to the literature on school management and academic competition by applying Terry's management functions to the management of an OSN coaching program and highlighting the role of internal-external collaboration as a strategy for strengthening student achievement



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INTRODUCTION

Education plays a central role in developing human resources that are capable, creative, and competitive, and educational management, understood as the planned, systematic process of managing resources through the functions of planning, organizing, actuating, and controlling is essential to achieving this goal effectively (Arfin & Anggraeni, 2017; Kresnawaty et al., 2025; Mohzana et al., 2024). Beyond academic instruction, schools cultivate students' talents and character through structured development programs coordinated by the National Achievement Center (Pusprenas), which also help shape discipline, responsibility, and social skills (Hibbin, 2024; Rino & Setiawan, 2025; Yahya & Masrukhin, 2026). One of the most prominent avenues for this development is participation in the National Science Olympiad (OSN), a nationally coordinated, tiered science talent competition for students from the elementary through senior high school level.

At the high school level, OSN spans nine fields, from Mathematics and the natural sciences to Informatics, Economics, and Geography and is designed to identify and select high-potential students from the school to the national level while building higher-order thinking skills such as analysis, synthesis, and evaluation (Jansen & Moller,

2022). Because success in the OSN depends on deep, systematic analytical ability rather than rote mastery of subject matter alone, achieving strong results requires a deliberately designed and well-managed coaching process (Haris et al., 2024).

Previous research on fostering achievement in the National Science Olympiad (OSN) has generally focused on isolated internal school coaching strategies, without specifically examining how collaboration between internal teacher-coaches and external tutors is managed within a management framework (Logayah et al., 2024; Ratnawati et al., 2023; Umar et al., 2025). The novelty of this study lies in its in-depth analysis of the management of internal-external coaching partnerships at SMA Negeri 2 Ponorogo as an integrated management process an aspect that has received limited attention in prior studies. More specifically, Ratnawati et al. (2023) examined the principal's strategy in enhancing student achievement through Olympiad coaching, while Umar et al. (2025) investigated the association between transformational leadership and STEM competition outcomes in Indonesian madrasahs, and Logayah et al. (2024) analyzed the item quality of a national academic olympiad's test instruments. None of these studies, however, specifically examined how internal school-based coaching and external professional tutoring are jointly managed within an integrated management framework, which constitutes the gap this study seeks to address.

SMA Negeri 2 Ponorogo is deeply committed to enhancing students' academic achievement, particularly regarding the National Science Olympiad (OSN). To this end, the school has implemented various coaching strategies including partnerships with Olympiad training centers that provide tutors who are themselves Olympiad medalists thereby ensuring that the training is intensive, targeted, and of high quality. Data on OSN achievements at SMA Negeri 2 Ponorogo from 2023 to 2025 reveals positive progress in student performance at both the regency and provincial levels. In 2023, eight students achieved success in the OSN, with six advancing to the provincial level. In 2024, the total number of achievers remained stable at eight, though the number of students reaching the provincial level dropped to four. Subsequently, in 2025, the total number of achievers saw a slight decline to six, with four students successfully reaching the provincial level. However, results from the 2026 OSN selection process showed an encouraging improvement; seven students qualified for the provincial level a higher figure than in the preceding two years. This upward trend indicates that the school's efforts in coaching, mentoring, and strengthening the OSN preparation program are beginning to yield positive results (Yasin et al., 2026).

These figures reflect the results of the 2025/2026 OSN selection cycle as recorded at the time of data collection, which took place after the manuscript's initial submission; they are reported here as the most recent available evidence of the coaching program's outcomes. This achievement also indicates that the management of OSN training at the school is functioning effectively and successfully enhancing students' competitiveness in academic contests. SMA Negeri 2 Ponorogo also conducts a specialized training program for students identified as potential OSN medalists. This program is designed to include practice with Higher-Order Thinking Skills (HOTS) questions, in-depth study of subject-specific material, and periodic competition simulations (Hidayanti et al., 2023; Noval et al., 2025). The participant selection process involves an Academic Potential Test (TPA) and a subject-specific proficiency test to identify students with exceptional potential. Consequently, the success of the National Science Olympiad (OSN) training program depends not only on the students' individual abilities but also on how the training management is designed and implemented. Therefore, in-depth research into the management of the OSN training program is required to enhance student achievement at SMA Negeri 2 Ponorogo (Noval et al., 2025).

Based on this context, the study focuses on the management of OSN coaching at SMA Negeri 2 Ponorogo and the efforts made to enhance student achievement. The research examines how the school plans, organizes, implements, monitors, and evaluates the OSN coaching program. Furthermore, it investigates the measures taken by the school to overcome obstacles and improve the program's effectiveness. Through this focus, the study aims to provide a clearer picture of how OSN coaching management is implemented at SMA Negeri 2 Ponorogo and how this process contributes to improved student achievement. Specifically, this study addresses the following research questions: (1) how does SMA Negeri 2 Ponorogo plan, organize, implement, and control its OSN coaching program according to the POAC framework; and (2) how is collaboration between internal supervising teachers and external Olympiad tutors managed to support student achievement?

METHOD

This study employs a qualitative approach with a case study design to gain an in-depth understanding of the management of National Science Olympiad (OSN) training in enhancing student achievement at SMA Negeri 2 Ponorogo. The case study approach was selected because the research focuses intensively on a single case, thereby enabling a comprehensive description of the training management process within a real-world context (Hyett et al., 2014).

The research was conducted at SMA Negeri 2 Ponorogo during the even semester of the 2025/2026 academic year. The research informants consisted of the school principal, the vice-principal for student affairs, and three OSN (National Science Olympiad) supervising teachers, specifically those overseeing Informatics, Chemistry, and Economics, selected based on their knowledge of and direct involvement in the implementation of the OSN coaching program. Data were collected through in-depth interviews, participant observation, and document analysis. Interviews were conducted to gather information regarding the planning, organizing, implementation, and supervision of the OSN coaching program. Observation was used to directly monitor the coaching activities, the interactions between supervisors and students, and the instructional strategies employed. Observations were conducted directly during training sessions on multiple occasions, guided by an observation checklist covering coaching activities, supervisor–student interaction, and instructional strategies, with field notes recorded to complement the interview data. Documentation included work programs, coaching schedules, student achievement data, and various other supporting documents (Chand, 2025).

Data analysis employed an interactive model comprising data condensation, data display, and conclusion drawing and verification. These three stages were carried out simultaneously from the data collection phase through to the completion of the research, thereby yielding systematic and in-depth findings (Huberman & Miles, 2012; Pahleviannur et al., 2022). Coding was carried out in two stages: deductively, using the four POAC functions (planning, organizing, actuating, and controlling) as the initial category framework, and inductively, to allow additional themes most notably the internal–external collaboration between supervising teachers and Olympiad tutors to emerge directly from the interview transcripts. Data validity was maintained through source triangulation by comparing information obtained from the school principal, the vice principal for student affairs, and the OSN supervising teacher. Furthermore, interview results were cross-verified with observational and documentary data to enhance the credibility of the research findings (Chitwattanakorn et al., 2024).

Informants were purposively selected on the basis of their direct involvement in, and first-hand knowledge of, the planning, organization, implementation, and evaluation of the OSN coaching program. Each interview lasted approximately 45–60 minutes and was guided by a semi-structured interview protocol developed around the four POAC management functions. Interviews were audio-recorded with the informants' consent, transcribed verbatim, and coded thematically; data collection continued until no new themes emerged across informants, indicating that data saturation had been reached. Saturation was judged to have been reached when three consecutive interviews yielded no new codes or categories relevant to either the POAC framework or the internal–external collaboration theme. Prior to each interview, informants were informed of the purpose of the study and provided informed consent, and their identities were treated confidentially throughout the research process. In addition to source triangulation, the credibility of the findings was strengthened through member checking, in which interview transcripts and preliminary interpretations were shared with informants for verification, as well as through peer debriefing with the academic supervisors and ongoing researcher reflexivity to minimize potential bias during data interpretation. It is acknowledged as a limitation that external Olympiad tutors and students themselves were not included as informants; their perspectives would further strengthen the evidentiary basis for the internal–external collaboration identified as this study's central finding. As a result, the findings on internal–external collaboration reported below are constructed primarily from the school's internal perspective, which limits triangulation across all key stakeholders and should be considered when interpreting the study's central finding.

RESULTS

Research findings indicate that the management of National Science Olympiad (OSN) training at SMA Negeri 2 Ponorogo is carried out through a coordinated series of processes, ranging from program planning, resource management, and the implementation of training activities to continuous monitoring and evaluation. These four processes reflect the management functions defined by Terry (Ajeng et al., 2025), planning, organizing, actuating, and controlling (POAC). In practice, these functions do not operate in isolation but are interconnected to support the training objectives: developing students' academic potential and enhancing their readiness for the OSN competition (Sabila et al., 2024).

The implementation of this training management involves various resources from both within and outside the school. The school conducts selection and preliminary training, forms coaching teams based on specific Olympiad disciplines, carries out routine and intensive training, and monitors student progress. Additionally, the school enhances the program through collaboration with external Olympiad tutors who provide in-depth explanations and competitive strategies. In summary, the implementation of OSN training management at SMA Negeri 2 Ponorogo, based on the four POAC management functions, is outlined in Table 1.

Table 1. Implementation of OSN Coaching at SMA Negeri 2 Ponorogo

Management Functions (POAC)	Implementation of OSN Coaching at SMA Negeri 2 Ponorogo
Planning	1. Participant selection is conducted in stages, comprising academic tests, motivation assessments, and interviews. 2. Performance targets are set to achieve qualification for provincial and national levels and to support the SNBP admission pathway.
Organizing	1. Allocation of duties for supervising teachers based on specific Olympiad disciplines. 2. Collaboration with Olympiad tutoring centers in Yogyakarta to engage external tutors.
Actuating	1. Training is conducted regularly, supplemented by intensive training sessions leading up to the OSN (starting 30 days prior). 2. Training strategies include in-depth content review, practice with Higher-Order Thinking Skills (HOTS) questions, problem analysis, discussions, mock tests, and competition simulations.
Controlling	1. Implementation of periodic tests, mock exams, and re-teaching support for participants requiring material reinforcement. 2. Program evaluation is conducted following the competition to serve as a basis for refining future training.

Planning for National Science Olympiad Training at SMA Negeri 2 Ponorogo

Interview analysis indicates that planning for OSN (National Science Olympiad) training is conducted systematically through the development of an annual program, participant selection, material preparation aligned with the OSN syllabus and test specifications, and the setting of achievement targets. The training program is not merely implemented in the lead-up to the OSN event itself but is an integral, ongoing part of the school's programming. The principal explained that the training stages range from initial dissemination of information and participant selection to actual coaching by school teachers and external tutors. *"The OSN program begins with informing the students, followed by subject-specific selection, training by school-based mentors, and subsequently by experienced external mentors in the respective fields."* (R1).

This statement was reinforced by the vice-principal for student affairs: *"The planning and scheduling of the National Science Olympiad training program are carried out systematically, in stages, and on a continuous basis. Training is not conducted solely prior to the OSN selection process; rather, it is an annual program integrated into the school's academic calendar."* (R2). *Mentoring teachers also develop materials based on the OSN syllabus and test specifications. "I align the material with the Economics OSN test specifications. We start with an introduction to the topic, then delve deeper, and conclude with practice questions."* (R4). *An Informatics teacher added, "We tailor the training material to the existing syllabus."* (R3)

Taken together, these accounts indicate that the school has systematically implemented the planning function, integrating annual programming, participant selection, and curriculum-aligned material preparation as an ongoing part of its academic calendar rather than an ad hoc, pre-competition activity.

Organization of National Science Olympiad Training at SMA Negeri 2 Ponorogo

The research results show that the school has established an organizational structure for OSN coaching with a clear division of tasks. Each Olympiad field has a mentor teacher and involves tutors from the Olympiad coaching institution, while coordination is carried out by the principal and vice-principal for student affairs. According to the principal, the school has formed a dedicated team to handle all OSN coaching activities. *"We have our own team, and there are tutors for each field."* (R1). Furthermore, the school collaborates with an Olympiad coaching institution in Yogyakarta that has experienced tutors in coaching OSN participants. *"We collaborate with a tutoring center in Yogyakarta that has proven its worth."* (R1), the vice principal, explained that coordination is achieved through scheduling, task allocation, and regular evaluations to ensure all coaching activities run effectively. *"Coordination is carried out through program planning, scheduling, task allocation, monitoring coaching implementation, and periodic evaluation of results."* (R2).

In sum, the organization of OSN coaching combines internal structures, a dedicated coaching team, discipline-based task allocation, and coordination among the principal, the vice-principal for student affairs, and coaching teachers with an external partnership with a professional Olympiad tutoring institution in Yogyakarta, giving each teacher clear responsibility for a focused coaching area.

Implementation of National Science Olympiad Training at SMA Negeri 2 Ponorogo

Interview results indicate that OSN (National Science Olympiad) training is conducted regularly outside of standard class hours, with the intensity increasing as the selection event approaches. The training is carried out intensively through in-depth content study, practice sessions focusing on Higher Order Thinking Skills (HOTS) questions, reviews of past OSN questions, discussions, mock tests, and competition simulations; these strategies aim to enhance students' conceptual mastery, critical thinking skills, and overall readiness for the competition. According to the Vice Principal, training sessions are scheduled after school hours or on specific days to avoid disrupting the regular curriculum: *"Training schedules are arranged outside of regular class hours, such as after school or through mutual agreement"* (R2).

The Informatics teacher explained that the instructional strategy relies heavily on practice questions and collaborative review: *"During OSN training, students are consistently given practice questions that are reviewed together. Students are encouraged to ask questions about any problems they do not yet understand"* (R3). The Economics coach also described a process involving content deepening, practice questions, and gradual evaluation: *"We start with an introduction to the material, followed by in-depth study, and conclude with practice questions. Any material that is not understood is explained again until the students have truly mastered it"* (R4). The Chemistry teacher added, *"Students are given HOTS-based questions"* (R5).

Beyond the interview accounts above, direct classroom observation corroborated these reports: observations indicated that the learning process was interactive, with the teacher acting as a facilitator who actively provided guidance, motivation, and feedback to the students.

Supervision and Evaluation of National Science Olympiad Training at SMA Negeri 2 Ponorogo

The research findings indicate that evaluations are conducted periodically through written tests, mock exams, practice exercise results, attendance records, and reports from supervising teachers. The principal stated: *"Monitoring is carried out through coordinators, by tracking supervisor attendance, and via direct oversight"* (R1). Upon the completion of the coaching sessions, the school conducts an evaluation to inform strategies for future coaching: *"Once the coaching concludes, an evaluation is held to facilitate improvements and refine test-taking strategies"* (R1). An Economics teacher explained, *"Written tests are administered multiple times to assess scores; for material that has not yet been mastered, the teacher re-explains the content and follows up with practice questions until the students fully understand it"* (R4). The Vice Principal added, *"Evaluations are performed by analyzing practice results, mock exam outcomes, student competency development, and reports from supervising teachers. Supervising teachers also noted that students take periodic tests; if any material remains unmastered, reteaching takes place alongside additional practice exercises until the students achieve the expected level of mastery"* (R2). Overall, the research results demonstrate that the management of OSN (National Science Olympiad) coaching at SMA Negeri 2 Ponorogo systematically implements the functions of planning, organizing, execution, and supervision/evaluation. Collaboration among the school, supervising teachers, and Olympiad coaching institutions was perceived by informants as an important contributor to coaching quality, although the interview-based evidence available in this study cannot establish its independent effect on student achievement (Hidayanti et al., 2023). In sum, supervision and evaluation are carried out through recurring, multi-source monitoring, tests, mock exams, attendance, and teacher reports that feeds directly back into targeted re-teaching.

Collaboration in Coaching by Teachers and Olympic Tutors

A key finding of this study is the implementation of a collaborative coaching model involving school-based supervising teachers and Olympiad tutors from professional tutoring institutions. Supervising teachers are responsible for reinforcing fundamental concepts, aligning materials with the school curriculum, monitoring student learning progress, and providing ongoing support. Meanwhile, Olympiad tutors focus on delivering in-depth coverage of complex topics, discussing advanced-level Olympiad problems, and training students in problem-solving strategies tailored to the specific nature of the OSN competition. This collaboration demonstrates a complementary division of roles. Supervising teachers possess a strong understanding of the students' characteristics, academic abilities, and learning progress, enabling them to provide personalized guidance. Conversely, Olympiad tutors bring specialized competitive

experience whether as coaches or former participants allowing them to offer insights into question patterns, competition strategies, and problem-solving techniques that utilize Higher-Order Thinking Skills (HOTS).

Table 2. Description of the Roles of Supervising Teachers and Olympiad Tutors

School Supervising Teacher	Olympiad Tutor
Selecting OSN participants	Providing in-depth coverage of material at the Olympiad level.
Developing a development program	Discussing advanced-level OSN problems
Provide regular guidance	Practice HOTS problem solving strategies
Monitoring student progress	Providing competition experience and techniques.
Conducting evaluation and follow-up	Providing practice tests and competition simulations.
Providing motivation and guidance	Sharing experiences as an Olympiad mentor or alumnus.

This division of roles demonstrates that the supervising teacher acts as a continuous academic mentor, while the Olympiad tutor serves as a subject-matter expert who strengthens students' competence regarding the material and competition strategies. The collaboration between the two is reported by supervising teachers and the principal as a complementary arrangement that strengthens the management of OSN training at SMA Negeri 2 Ponorogo, though this study's interview-based design does not allow the specific contribution of that collaboration to be isolated from other coaching factors.

DISCUSSION

This section discusses the findings presented above in relation to Terry's POAC management functions and prior literature on educational management, following the descriptive presentation of the results.

According to Terry, planning is the process of defining desired goals and determining the best steps to achieve them. Planning serves as a fundamental management function because all organizational activities rely on the clarity of planned goals, strategies, programs, and resources (Mashady, 2025). The findings of this study indicate that the systematic development of a guidance program provides clear direction for both the supervising teacher and the students throughout the guidance process. These findings align with research (Mahing et al., 2025) which states that the success of an educational program is influenced by thorough planning, encompassing the formulation of work programs, activity scheduling, the setting of achievement targets, and the alignment of material with students' needs. Thus, the planning for OSN preparation at SMA Negeri 2 Ponorogo adheres to the principles of management effectiveness, as all activities are structured based on competition requirements and the goal of enhancing student achievement.

According to Terry, the function of organizing is the process of grouping activities, establishing the division of tasks, authority, and working relationships so that organizational goals can be achieved effectively. Good organization enables each member of the organization to understand their roles and responsibilities, thereby minimizing overlapping work (Albert, 2024). These research findings demonstrate that the successful management of the educational program is heavily influenced by a clear organizational structure, a division of tasks aligned with competencies, and effective coordination among personnel (Asni et al., 2023). Furthermore, partnerships with Olympiad coaching institutions provide added value through the expertise of tutors who have excelled in Olympiad competitions, thereby optimizing the quality of the training. Consequently, the organization of OSN training at SMA Negeri 2 Ponorogo exemplifies the effective implementation of the organizing function through both internal and external collaboration.

The training environment is interactive, with teachers acting as facilitators who actively provide guidance and feedback to help students improve their understanding of the material and their readiness for the competition (N. S. Aulia & Setiawan, 2025). According to Terry, the actuating function is the process of mobilizing human resources to carry out tasks in accordance with established plans (Nurjaman et al., 2024). Successful implementation depends heavily on the leader's ability to motivate, direct, and create a conducive work environment. In the context of OSN preparation, the teacher serves not merely as a source of information but also as a facilitator who helps students develop critical thinking, analytical, and problem-solving skills.

The findings of this study align with research which states that effective OSN training is conducted through HOTS-based practice questions, reviews of questions from previous years, competition simulations, and continuous, intensive mentoring (Ichsan, 2019; Kwangmuang et al., 2021; Tyas & Naibaho, 2021). Furthermore, interactive instruction with teachers acting as facilitators enhances students' learning motivation and academic achievement. Thus, the implementation of the "actuating" function in the OSN training program at SMA Negeri 2 Ponorogo aligns with modern educational management principles that prioritize active, student-centered learning (N. S. Aulia & Setiawan,

2025). The management of OSN preparation at SMA Negeri 2 Ponorogo demonstrates that achieving academic success relies heavily on the planned, structured, and sustainable management of educational resources (Anggraeni et al., 2025; Syafriadi et al., 2025).

According to Terry, the controlling function involves comparing actual performance against established plans and subsequently taking corrective action if deviations are detected (Iyobhebe et al., 2024). Supervision serves not only as an assessment tool but also as a basis for decision-making aimed at improving program quality for future periods. Periodic evaluation, comprising tests, mock exams, monitoring of student progress, and instructional follow-up constitutes an effective strategy for enhancing the success of achievement-oriented training programs (Hidayanti et al., 2023). Furthermore, the success of academic development is heavily dependent on a continuous evaluation system, allowing students' weaknesses to be promptly identified and addressed (Anggraeni et al., 2025; Syafriadi et al., 2025). Thus, the controlling function in the OSN preparation program at SMA Negeri 2 Ponorogo has been systematically implemented through monitoring, outcome evaluation, and instructional follow-up, thereby supporting the continuous improvement of student achievement.

These findings indicate that integrating internal and external coaching is a crucial factor in the effectiveness of OSN preparation at SMA Negeri 2 Ponorogo. Supervising teachers ensure the continuity of the school-based learning process, while external tutors provide material enrichment and competitive experiences that are difficult to obtain through regular classroom instruction. This synergy enables students to receive comprehensive coaching that addresses conceptual mastery, analytical skills, and mental readiness for the competition. The findings of this study align with the Resource-Based View (RBV) theory (Vasudevan, 2021), which posits that organizations gain a competitive advantage when they are able to optimize internal resources and synergistically leverage external resources to achieve organizational goals. In an educational context, collaboration between school teachers and external experts represents a form of resource optimization that can enhance the quality of support services for fostering academic achievement (E. D. Aulia & Hadi, 2025; Norwich et al., 2026).

Furthermore, the study indicates that the success of nurturing high-achieving students depends on collaboration among various stakeholders, including school principals, supervising teachers, and external partners possessing specialized expertise (Hidayanti et al., 2023). The establishment of partnerships between schools and professional institutions contributes to enhancing the quality of guidance and instruction through the transfer of experience, material enrichment, and more innovative teaching strategies (Alief et al., 2025). Thus, the involvement of Olympiad tutors is not intended to replace the role of the supervising teacher but rather to strengthen the training program. The supervising teacher remains the students' primary guide throughout the learning process, while the Olympiad tutor serves as an expert resource providing in-depth subject knowledge, competition strategies, and practical experience for the National Science Olympiad (OSN). This collaborative training model is a key strength of the OSN training management at SMA Negeri 2 Ponorogo in its efforts to boost student achievement.

CONCLUSION

Research findings indicate that the management of the National Science Olympiad (OSN) training program at SMA Negeri 2 Ponorogo has been implemented systematically through the integrated application of planning, organizing, executing, and controlling functions. Planning involved developing an annual program, selecting participants, scheduling, designing materials based on the OSN syllabus and assessment blueprints, and setting achievement targets; organizing was realized through team formation, task allocation based on Olympiad disciplines, and collaboration with external tutors; execution was carried out via routine guidance, in-depth material study, Higher-Order Thinking Skills (HOTS) practice, mock exams, and competition simulations; while supervision was conducted through periodic testing, progress monitoring, evaluation, and reteaching. A key finding of the study reveals that collaboration between internal supervising teachers and external Olympiad tutors is a crucial factor in maximizing training resources, as teachers provide consistent, personalized guidance, while external tutors strengthen mastery of advanced material and competitive techniques. Consequently, the increase in the number of students reaching the provincial level, rising from four in 2025 to seven in 2026, appears to be associated with the systematic and collaborative training process, although this qualitative single-case design cannot establish a causal relationship between the coaching-management model and the improvement in achievement. This study is limited by its focus on a single school and a relatively small group of managerial and teacher informants, and it did not include external Olympiad tutors or students as informants. Future research is therefore encouraged to adopt multi-site, longitudinal, or mixed-method designs capable of testing the relationship between coaching-management practices and measurable achievement outcomes, and to incorporate the

perspectives of external tutors and students to further strengthen the evidentiary basis for internal–external collaboration in OSN coaching.

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RA contributed to the study's conceptualization, data collection, data analysis, interpretation of findings, and drafting of the initial manuscript. AJ contributed as the first academic supervisor through concept development, methodological guidance, critical revision, and supervision of the research and manuscript preparation. SU contributed as the second academic supervisor through methodological guidance, critical review, validation of findings, and supervision of manuscript development.

AI DISCLOSURE STATEMENT

The authors used ChatGPT during the preparation of this work for language editing, enhancing clarity and readability, and refining the presentation of the manuscript. After using the tool, the authors thoroughly reviewed and edited the content as necessary and bear full responsibility for the content of this publication.

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