

EXTRACURRICULAR SUCCESS OF EARLY AI EDUCATION: A CASE STUDY OF THE APP-IN CLUB

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Abstract— Integrating Artificial Intelligence (AI) education in K-12 schools is crucial for equipping future generations with the skills necessary for the digital age. This paper presents a case study of the App-In Club, a student-run, nonprofit organization that serves as a model for extracurricular AI and app development education globally. By examining the club’s educational framework, organizational structure, and community impact, the study demonstrates how the club enhances AI literacy and instills an AI-driven mindset among its members. The club’s tiered educational approach, combined with active involvement in competitive environments, encourages a transformation of students from learners to leaders, empowering them with critical skills for future challenges and roles. This case study provides a blueprint for replicating such an educational model to support AI and app development education among K-12 students, emphasizing its adaptability and scalability.

Keywords— AI Education, K-12, Computational Thinking, Student Leadership, Community Impact

I. INTRODUCTION

As AI technology develops and grows into various aspects of life and work, integrating artificial intelligence (AI) education into K-12 settings has increasingly been recognized as a major aspect of preparing students for their future careers. Studies have showcased the transformative impact of AI in educational settings, urging the necessity for AI literacy and critical thinking skills among students. These competencies are essential as AI applications offer personalized learning experiences and support a multitude of educational needs, ultimately creating a well-equipped generation for the digital age [1]. Additionally, the increasing implementation of AI education at the K-12 level reflects its growing importance and the need to adapt educational systems to accommodate this technological shift [2].

Publicly launched on November 6, 2022, the App-In Club—a student-run, nonprofit organization—promotes AI and app development among students globally. Recognizing the limited scope of clubs focused solely on coding and computer science. The App-In Club offers a comprehensive approach that includes practical application and computational thinking. Using tools like MIT App Inventor, the club makes AI and app development accessible to all skill levels. Since its inception, the club has grown into a global community with over 500 registered members, showing widespread student interest.

This case study details the operations and achievements of the App-In Club, providing a model for early AI education.

By examining the club’s methods in teaching AI and app development, this study serves as a blueprint for other educational communities aiming to integrate similar programs. We hope to inspire communities to adopt these practices, thereby improving AI literacy among K-12 students and empowering the next generation of AI leaders and innovators.

A. Educational Framework

The App-In Club’s curriculum is divided into three progressive tiers—beginner, intermediate, and advanced—each designed to enhance students’ app development and computational thinking skills. At the beginner level, students learn fundamental programming with MIT App Inventor through structured tutorials, creating projects like weather forecasts and to-do lists. The intermediate level introduces more complex technologies such as AI, APIs, and hardware integrations, employing tools to integrate AI into projects involving cloud architecture. The advanced level focuses on research and development with Python and other professional tools, developing advanced computational and problem-solving skills. A gamified XP system rewards educational activities, differentiates members’ skill levels, and creates a competitive and motivated learning environment.

Beyond education, the club functions as a self-sustaining community of learners and leaders. As members progress, they are encouraged to participate in competitions, which develop their expertise and prepare them for mentorship and leadership roles. Competent members can volunteer as instructors or mentors, supporting new club members. Additionally, experienced members are encouraged to apply for leadership positions, allowing them to impact the club’s operations.

B. Organizational Structure and Roles

The App-In Club operates under a structured system consisting of an executive team and three specialized committees. The executive team includes the President, who oversees all management and operational aspects of the club, including strategic planning and ad-hoc tasks; the Vice President, who assists in managing a specific operational area and ensures progress on initiatives; and the Secretary, who supports the President and Vice President in managing workloads and documentation, including meeting summaries. Additionally, the club features three main committees: the Project and Event Committee, which is responsible for planning and organizing project proposals and ensuring quality; the Finance

Committee, which handles budgeting, fundraising, and financial reporting; and the Publicity Committee, tasked with enhancing student engagement and boosting the club's visibility through promotional activities.

C. *Event Strategy*

The App-In Club organizes diverse events to support educational goals and community engagement. For example, the Monthly workshops, hosted by accomplished club members or officers, focus on practical application development. Seasonal crash courses (Spring, Summer, Fall) build from basic to advanced application design, starting with foundational skills in MIT App Inventor and advancing to complex themes like AI applications such as integrating chatbots and image recognition. Competition training camps prepare members for high-level competitions, improving their practical and strategic skills. Besides courses and training, the club holds lectures and conferences, gathering industry professionals and academic scholars to provide insights into technological advances and professional development. Last but not least, the annual summation meeting evaluates the club's performance, sets future objectives, and celebrates a sense of community.

II. RESULTS

A. *Recent Events and Participation*

The App-In Club has recently successfully organized several events focusing on AI education and app development. Toward the end of 2023, the club had attracted over 350 registered participants globally. By the spring of 2024, nearly 300 students had registered for courses and events. This substantial engagement highlights the app-in club's commitment and impact to fostering a global community for young AI enthusiasts and enhancing K-12 AI education.

B. *Current Overall Impact*

The club has engaged over 1,000 students in AI and app development across multiple events and courses. There are 577 registered members, with a Discord server community of 408 members. The club includes 33.70% girls, 62.43% boys, and 3.87% non-binary members. The club's diverse and inclusive environment continues to attract and support a wide range of aspiring AI educators and future AI developers.

C. *Competition Achievements*

The achievements of App-In Club members in various national and international competitions showcase the effectiveness of the club's educational and training initiatives. In the MIT App Inventor Appathon for Good (August 2023), members secured the top three places in the Youth Individual category. Additionally, the club won first and second place in the Youth Team category with Calmify and ProductiviTeams. At the CIE Youth STEM Convention (August 2023), all 27 top

places were secured by our members. In the ACP MetroCode competition (November 2023), our members won all 11 top places. In the World Artificial Intelligence Competition for Youth (December 2023), members won first place in both the AI Showcase Track and AI-Generated Art Track with Scribe AI and Grand Canyon Family Trip. In the Congressional App Challenge (January 2024), 11 teams from the club were recognized as winners for their congressional region. Furthermore, at the Regeneron ISEF (May 2024), members won first and third place in the BEHA and MATS categories and finalist positions in the TMED and BMED categories. These successes are significantly influenced by the App-In Club's structured support and training programs designed to enhance members' competitive performance. Almost all the competition or award winners participated in club courses, camps, and activities. These results affirm our club's role in developing future innovators and leaders in AI and app development.

III. CONCLUSIONS AND FUTURE WORK

The App-In Club has successfully brought AI education and advanced an AI-driven mindset to its members and the wider community. Through a structured educational framework, the club enriches students' extracurricular activities with comprehensive AI and app development learning opportunities. Members create their own apps, participate in competitions, and attend informative seminars, broadening their perspectives and deepening their technical understanding. The club's effective cycle, where students teach and organize activities, promotes personal growth and understanding, evidenced by successful outcomes.

Looking ahead, the club plans to expand by establishing more chapter clubs across the United States, focusing on supporting marginalized communities. This expansion aims to make AI education more accessible and inclusive, enabling students from diverse backgrounds to become local leaders and positively influence their peers and communities.

The successes and strategies detailed in this case study highlight the App-In Club's role as a model for early AI education. We hope this model will inspire other communities to implement similar educational strategies, equipping more students with essential skills to become innovators and leaders in an ever-evolving society.

REFERENCES

1. Walter, Y. Embracing the future of Artificial Intelligence in the classroom: the relevance of AI literacy, prompt engineering, and critical thinking in modern education. *Int J Educ Technol High Educ*, 21, 15 (2024). <https://doi.org/10.1186/s41239-024-00448-3>
2. Yue, M.; Jong, M.S.-Y.; Dai, Y. Pedagogical Design of K-12 Artificial Intelligence Education: A Systematic Review. *Sustainability*, 2022, 14, 15620. <https://doi.org/10.3390/su142315620>