Journal of Community Services: Sustainability & Empowerment
Vol. 05, No. 2 September, 2025 pp. 1 - 7

sUAV Technology Introduction to Junior High School Students and Teachers: A Hands-On Workshop

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Article History:
Received: January 7th, 2026
Revised: March 3rd, 2026
Accepted: March 6th, 2026

Keywords: *community service, high school, sUAV, unmanned aerial vehicle, workshop*

Abstract: *Small Unmanned Aerial Vehicle (sUAV) is operated with no pilot. There has been growing improvements in drones, especially in public security, monitoring, military and disaster operations, traffic surveillance, agriculture, and many more. The purpose of this community service activities was to help junior high school students gain basic knowledge of sUAV and have opportunities to fly basic movements of the drone indoor at low altitude. There were 5 Unmanned Aerial Vehicle (UAV) prepared for this workshop. D-day workshop activities were only 2 hours on 2 October 2025 including preparation at the school. The workshop has been successfully conducted with around 30 participants. Participants had experience to fly indoor sUAVs with the mobile application as the controller and through wireless networks for connectivity, with basic maneuvers (take off/landing, forward/ backward, roll left/right, yaw left/right, and up/down), and took picture in at eye level. Total number of participants was sufficient with the supporting technologies brought to the school.*

Introduction

Small Unmanned Aerial Vehicle (sUAV) known as drones are operated with no pilot onboard (Bolick et al., 2022). There has been a growing improvement in drones, especially in public security, monitoring, military and disaster operations, traffic surveillance, agriculture, and many more (Mohsan et al., 2022). Drones have various sizes, also made from lightweight materials that allow drones fly fast in low and high altitudes (Biro Komunikasi dan Informasi Publik, 2022) within safe fly zone.

Drone is an essential factor in education (Ismail Al-Alawi & Alnuwaihedh, 2025), and its usage has recently extended into education fields to support learning as an alternate strategy to transform learning environments (Pergantis & Drigas, 2024). This technology needs to be introduced to the students at an early stage, especially junior high school to helps students

visualize sUAVs practical applications in sectors such as construction, environmental monitoring, and emergency response (Marzuki, et al., 2025).

The main purpose of this community service activity was to introduce junior high school students to the basic knowledge of sUAVs and give students the opportunity to pilot one indoors using basic movement skills.

Methodology

In December 2024, there was a seminar about sUAVs in SMP Negeri 174 Jakarta with the audience of teachers and staffs about the opportunities in teaching students about STEM topics using sUAV (Prasetyo et al., 2024). Below is the flow of the community service activities. Although it looks sequential, some activities overlapped and ran in parallel, as shown in the Figure 1:

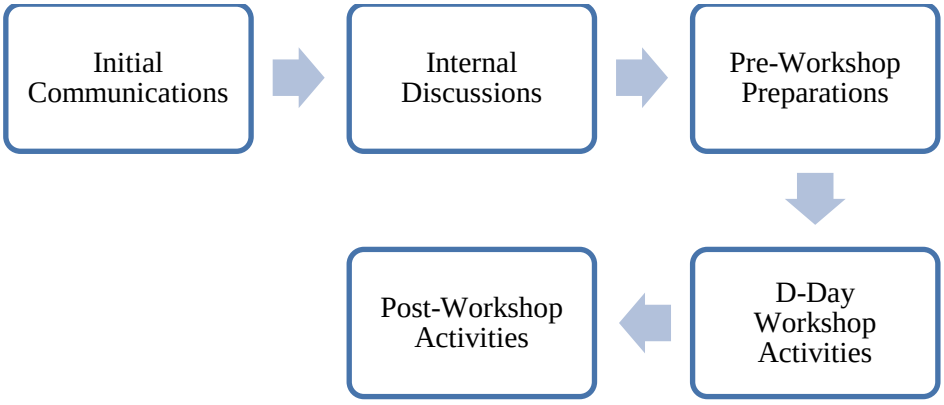

Figure 1. Community Service Activities

Initial communications established with the vice school principals a month prior the workshop. Communications were mostly about the topic, appropriate date and time for the workshop, workshop location, number of workshop participants, audiences, and snack boxes. Most of the communications were in instant messaging and audio calls.

Internal discussion was mostly within the faculty members in the Information System study program during office days and office hours through weekly offline regroup meetings or via office instant messaging service. Tasks were distributed for the community service activities. Discussions were much on the contents on the topic, timeline for deliverables, also event rundown. This stage was around 2-3 weeks.

Pre-workshop preparations were more into activities that supported the workshop. A square-sized e-flyer has been generated with the support of generative AI to make community service information could be distributed in the school internally. The e-flyer contained information about the title, the resource person's name, community service location with date and time. Figure 2 shows the e-flyer design:

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Figure 2. Community Service Square-Size e-Flyer

There were 5 Unmanned Aerial Vehicle (UAV) prepared for this workshop. They were 4 sUAVs and 1 UAV prepared for this community service activities with their batteries, backup batteries, and battery chargers to ensure students were able to fly sUAV indoor without GPS. We borrowed some of the UAVs from the laboratory to support this, and others were from personal units.

The workshop was conducted on 2 October 2025 for 2 hours including the preparation of the workshop. Post-workshop activities were generating certificates for the resource persons to be signed by the school principal, then generating certificates also for all participants to be signed by the Head of Center for Research and Community Services (CRCS) Sampoerna University. We also prepared a manuscript for publication in community service journal, posted a community service activity as a LinkedIn post for activity documentation purposes, and finally wrote a report to be submitted to the CRCS.

Results

The workshop was successfully conducted with approximately 30 participants including teachers and students. Basic knowledge about sUAVs is delivered by the resource person; this was essential to have technical and non-technical information about the sUAVs for junior high schoolers. Figure 3 shows how basic sUAV knowledge was delivered to the participants.

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Figure 3. Basic UAV Information Session

During the Basic UAV session, participants were also introduced to the basic rules for flying drones, such as the maximum flying height is 150 meters or 492 feet. And drones must not be flown within 15 kilometers of any airport. Since, the workshop is conducted at SMP Negeri 174 Jakarta, which is located approximately 5 to 6 kilometers of Halim Perdanakusuma International Airport, the flying practice was conducted indoor with the maximum flying limit of 2 meters.

Participants had the experience of flying sUAVs indoors with the mobile application as the controller and through wireless networks for connectivity, with basic maneuvers (take off/landing, forward/backward, roll left/right, yaw left/right, and up/down), and took picture in at eye level. Participants were also introduced to flight simulator mobile app (DJI, n.d.), so they can later learn to fly drones by themselves in the future.

All participants were grouped into 3 to ensure all participants gain sufficient hands-on experience to fly the sUAV indoors. Drone-integrated STEM learning experiences can be enhanced with instructional strategies through teamwork and hands-on activities (Yeung et al., 2024). They prepared sUAVs, batteries, and backup batteries were sufficient to accommodate the workshop. The workshop session ended with a sharing session about the unmanned underwater vehicle implementation in oil and gas companies, especially for offshore.

Discussion

Community service activities were completed at the end of October 2025, and begun in early August 2025. This three-month community service activity series shows the completion status in the following Table 1:

Table 1. Community Service Results

#	Activities	Status
1	Initial Communications	Completed
2	Internal Discussions	Completed
3	Pre-Workshop Preparations	Completed
4	D-Day Workshop Activities	Completed
5	Post-Workshop Activities	Completed

All activities showed 100% completion with a mix of online and offline activities during the initial phase through the preparations, the rest were offline activities. There was an sUAV and some novels donated to the school. We hope the school can conduct similar activities for the students in the future. Novels will be placed in the school library to enrich the library collections. Figure 4 shows the donations process:

Figure 4. School Donations

Some photos were taken for documentation purposes. After the donations have been delivered to the school, then group photos with all participants and resource persons taken as shown in Figure 5 to conclude the entire workshop event.

Figure 5. Group Photo Post-Workshop Event

Conclusion and Recommendation

This article provides information about the community service activity conducted by the Information System study program at Sampoerna University with the SMP Negeri 174 Jakarta. The community service topic on sUAV was suitable for junior high school students. Flying an sUAV is another skill set (Bolick et al., 2022) that can be learned to support future needs. The total number of participants was sufficient, supported by the technologies brought to the school.

Furthermore, with the donated drone unit, the school is now equipped to use the drone independently. The workshop included a dedicated training component for teachers, helping them to facilitate future flying sessions and technical orientations. This allows SMP Negeri 174 Jakarta to integrate sUAV technology into their extracurricular without requiring constant external supervision.

A recommendation for future work is to conduct similar community service activities with a longer workshop durations, preferably a half or full-day workshop, so participants can be more enthusiastic and explore the sUAV further. Pre- and post-surveys are also important to prepare for the next community service activities.

Acknowledgements

This Information System study program community service activity was fully supported by the CRCS Sampoerna University. We would like to express our deepest appreciation for the warm welcome from SMP Negeri 174 Jakarta.

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