

Drones as a Teaching Instrument in the Social Studies Classroom

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Abstract

Drones have been considered a hot new technology for classrooms, albeit somewhat inaccessible. They can often be found in Science, Technology, Engineering, and Mathematics (STEM) settings, in classrooms offering Gifted and Talented (GT) programming, or in advanced high school classrooms. It is rarely seen in elementary social studies classrooms, however. And that intrigued me. Could drones become accessible tools for elementary classrooms? We were determined to find out.

Introduction



I learned basic drone flight safety using the DJI Mavic Mini 3 Pro. This particular drone weighs less than 250 grams, records 4K videos, is regulation friendly, and retails at approximately \$800. The recording can be to the SD card or directly to

your phone, with a slight degradation in video quality if the latter approach is utilized. Flight training for students is a definite requirement but it is important to note that training is accessible for early elementary. I met with my drone instructor on two separate occasions. In those meetings, the drone instructor was able to show me things with the drone I had never imagined.

These lessons from her drone instructor also helped dispel many myths I held about flying drones, given the little experience I had previously. In researching, one of the common themes has been drone misperception and misconceptions. Research is showing that with education such as “aviation-focused after-school programs, development of new interdisciplinary/transdisciplinary courses and programs incorporating aviation, establishment of aviation minors and aviation university-level electives, development of informal aviation programs working with museums and facilitating summer aviation camps for high school students” in schools, especially elementary schools, many myths can be dispelled for students and their families (Keilman, 2019, p. 40).

By starting small, with drone clubs, schools can involve smaller groups of students and slowly integrate the material being taught in the clubs and expand it into the classroom and curriculum.

Ultimately, this theoretical activity on the accessibility and usefulness of drones in an elementary social studies classroom can be deemed a success.

Literature Review

The exercise to find a place for drones in an elementary classroom was treated as a purely theoretical one. I reviewed existing literature for examples of opportunities where drones may have been used explicitly for social studies instruction in any setting K12. With limited success, the search was expanded to include drones used in any setting related to the NCSS themes of social studies. I was able to find examples relating to Themes 1 (Culture), 2 (Time, Continuity, and Change), 3 (People, Places, and Environments), 6 (Power, Authority, and Governance), 7 (Production, Distribution, and Consumption), and 8 (Science, Technology, and Society) (NCSS, 2022). Several of these examples will be further developed below.

To further clarify, while connections can be made, these connections can be tenuous at best. “Some disciplines, by virtue of their subject matter and focus, find the incorporation of drones into their research agenda easier than others... studying [in the physical sciences] using drones is easier and more straightforward than the social sciences, in which the subject matter is society itself and the unit of analysis is often humans” (Hall and Wahab, 2021, p. 2). To that end, we will describe three ways that drones can be incorporated in an elementary social studies classroom - (1) drones as photo elicitation tools, (2) drones for participatory action mapping, and (3) drones for landscape archeology. Each of these will be grounded in meaningful learning theory (Ausubel in Yepes, et. al., 2022). This theory complements Piaget’s learning by discovery.

As students gain experience and confidence through the initial and intermediate learning phases, they are able to focus more on the data they are collecting or the images they are analyzing rather than on the flying of the drone itself. We believe that Yepes’ work, which is targeted for pedagogical technology of drones in STEM fields, is helpful in transferring pedagogical concepts between the fields. For example, the article suggests that students working through an active methodology inclusive of drone flying would see non-cognitive skill development such as “leadership, ability to work as a team, improvement in interpersonal relationships, being an effective agent of his/her learning ... [and the ability] to start to act as a mentor or facilitator of this process” (Yepes, et. al, 2022, p. 202). Each of the examples for drone implementation outlined below is grounded in the notion that the students are centered in the process of analysis and inference.

The following section will outline specific opportunities for integration.

Options for Integration

Drones as Photo Elicitation Tools

Hall and Wahab (2021) provide recommendations for relevant social sciences that would implement photographic products as data. “Some social science disciplines are more inclined to relying on visual methodologies than others. The social science disciplines of ... economics, geography, [and] history ... have found drones to be useful research tools.... Given drones’ advantage of providing access to a bird’s eye view of the geographical space and geography’s preoccupation as a spatial science, drones have found a much more accepting audience among geographers compared to other social scientists” (p. 2). Drones offer several benefits when compared with satellite imagery. These include that drones are able to fly at lower altitudes, they cover a smaller area, and they are able to provide vivid visuals that elucidate a more familiar perspective -- making them a much stronger tool for field work. Students can use these drones specifically for the high quality images they can create and, subsequently, as photo elicitation tools.

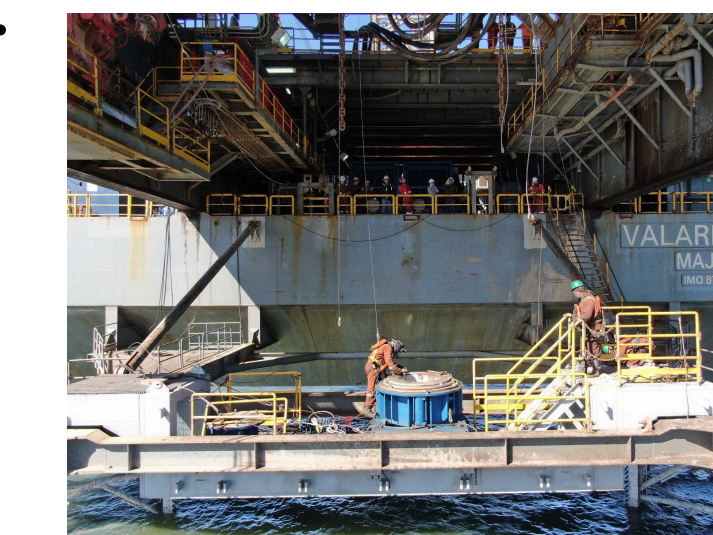


Photo elicitation is aligned to social studies primary source analysis. Students can use these images to engage in critical conversations and create meaning (Glaw et al., 2017).

Our elementary TEKS cover both community helpers and city planning, so the images captured in these scenarios are directly applicable for photo elicitation. While not new, elementary social studies teachers can draw on the OPTIC strategy for visual analysis in concert with photo elicitation. With OPTIC, the students may work in groups, partners or independently to analyze an image for: (1) Overview, (2) Parts, (3) Title, (4) Interrelationships, and (5) Conclusion (Newbold, 2017). This process can be simplified and adjusted to fit the needs of the learners.

Drones as Photo Elicitation Tools

Another extremely interesting claim from this article is the use of drones for participatory action mapping (PAM) to “[bolster] the political and legal claims of indigenous communities to counteract land grabs by foreign entities” (Hall & Wahab, 2021, 4). Specifically, this example talked about the reservation borders in Oklahoma. It shared how non-indigenous farmers infringe on reservation land and that some tribal nations have invested in drones to monitor their borders to ensure that legal claims are maintained. The intersection of technology, politics, and history is obvious and fascinating. Students can use the base layer of information in order to work on crafting arguments for debate -- a skill that is necessary in a social studies classroom as well as a skill that is explicitly looked for in the current edTPA portfolios for middle grades social studies instruction. One could also expand the conversation. Where else might drones to support participatory mapping be needed? In Texas, students might almost automatically begin thinking about the Rio Grande and the controversial disputes and altercations that happen on our own border. What impact would investing in drones have there?

Options (Continued)

Drones for Landscape and Community-Based Collaborative Archeology

Finally, Sesma (2020) describes a concept that is known as both landscape and community-based collaborative archeology. During this particular study, Sesma focused on the use of digital and visual technology to document community interactions within their environment with an attempt to preserve history for future generations. The author conducted walking interviews with residents of the community, and noted several issues that could be mitigated by the use of drones. Namely, mobility issues faced by the participants as they tried to access the various sites and landmarks could easily be addressed. Additionally, it was not just mobility issues for the community members; some sites were overgrown from lack of use. The author noted that inclusivity is a concern, not just preserving history for future generations.

The use of drones in a social studies classroom offers accessibility for a variety of students from different socioeconomic backgrounds. While one student may be well traveled, another may not have left her neighborhood. To that end, “digital archaeological methods have also been incredibly useful in public engagement and outreach to diverse audiences” (Sesma, 2020, p. 3). On a personal note, I see this as an incredible opportunity to better access Quanah Parker’s Star House in Cache, Oklahoma. The house is currently dilapidated and dangerous to walk. It is also in a remote location. Drone footage would bring the past to the present, in this instance. Quanah Parker comes up in the TEKS in Grade 7, but the example can be applied to various Texas historical locations more relevant to the fourth grade standards.

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