

SMARTPHONE ASTROPHOTOGRAPHY

Andrew Fisher^a and Steven Hinckley^a

Presenting Author: Associate Professor Steven Hinckley (s.hinckley@ecu.edu.au)

^aSchool of Science, Edith Cowan University, Joondalup WA 6027 Australia

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The continuous stream of astronomical information being released to the public has resulted in an increased interest in astronomy (Marusic & Hadzibegovic, 2018). However, the cost of acquiring good quality images of astronomical objects using appropriate astronomical instruments (cameras and telescopes) is still significant. To encourage more activity in this area, it will be necessary to achieve lower costs for higher quality imaging. Over the last few years, smartphone cameras have progressed exponentially in quality and functions, allowing images to be captured with clarity by the most basic of users, without the need for a specific telescope (Blahnik & Schindelbeck, 2021).

The aim of this project was to develop material that allows the demonstration and instruction to students on the use of modern smartphones for astrophotography. This included a comparison between a smartphone and a digital camera, and the development of an educational tool and guide for potential assignments and projects in astronomy at primary, secondary and tertiary levels.

A series of photographs were obtained of a number of celestial features using both a typical DSLR (Canon 450D) and a Smartphone (Samsung Galaxy S22 Ultra). A range of exposure parameters (ISO and exposure time) were examined for image quality. Figure 1 shows the difference between images, of the Milky Way galactic core. Both photos were taken with the same camera settings (ISO and exposure time). The smartphone image was of excellent quality, without needing processing.

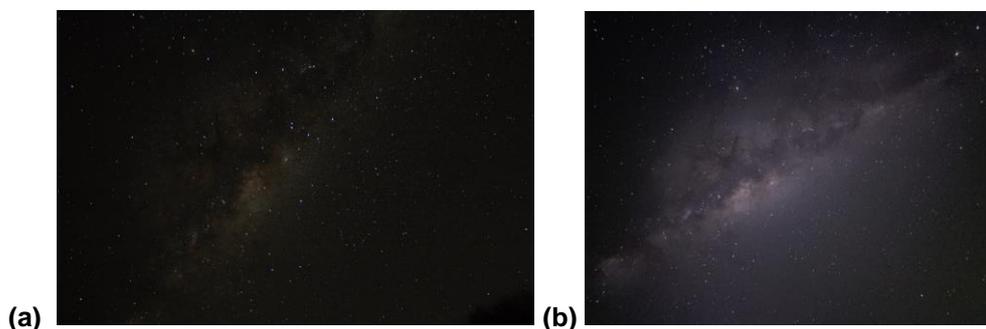


Figure 1: Photographs of the Milky Way galactic core taken using (a) a DSLR camera, and (b) a Samsung smartphone. The camera settings for both devices were an ISO of 1600 and an exposure time of 20 seconds.

A short instructional video (Fisher, 2022) was created that demonstrated processes for utilizing the smartphone for astrophotography. The video outlined how and when to take photos of a target area (using apps such as *Stellarium* and *Accuweather*), how to use a modern smartphone camera (specifically Samsung devices), and how to edit the photographs to improve image quality (using *GIMP*). This video is to be implemented in our introductory astronomy unit in 2023.

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