

# Inquiry-Based Biology before, during and after lockdowns: learner engagement and experience

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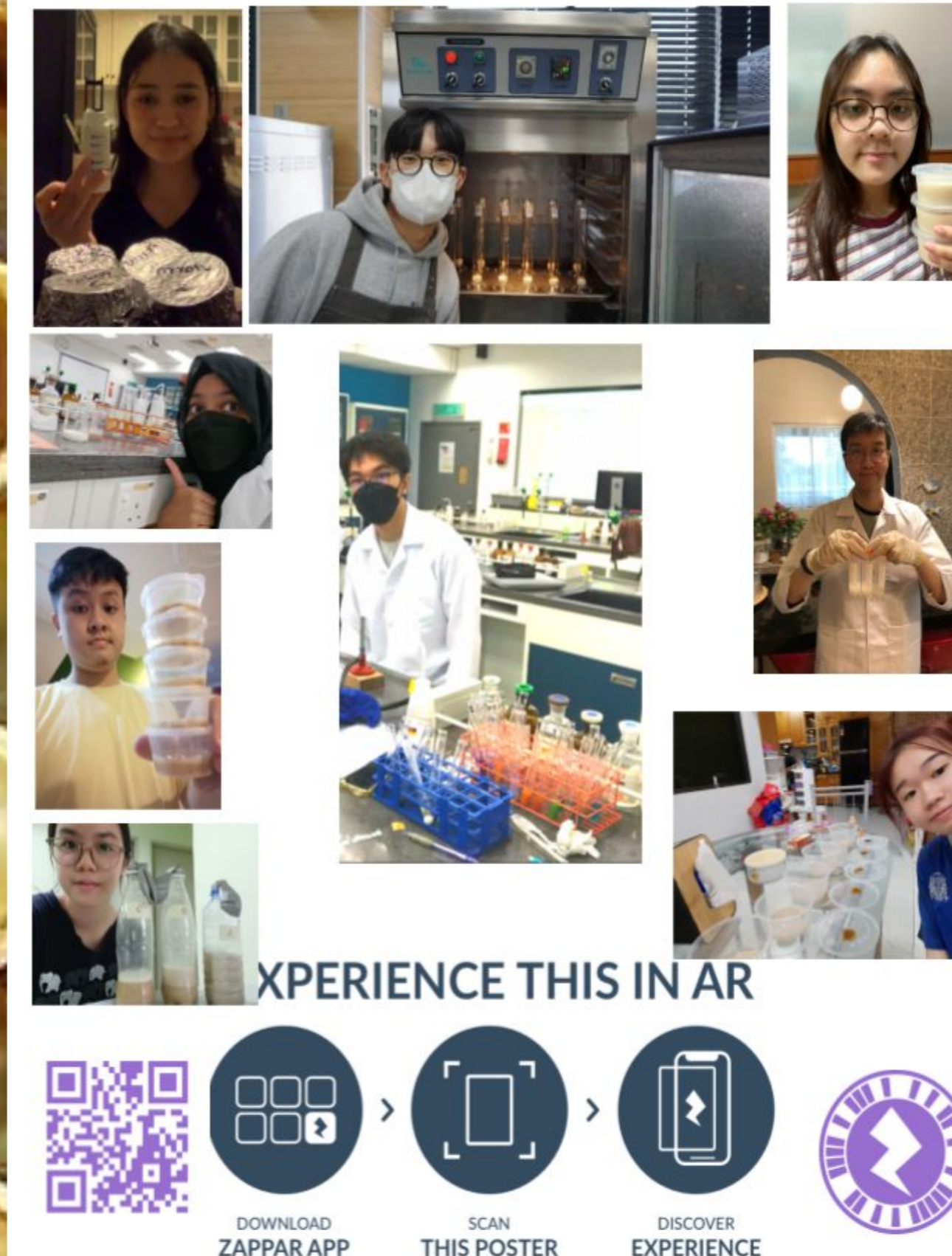
## Introduction

Inquiry-based biology (IBB) involves the scientific investigation of formulated hypotheses in relation to theory. IBB is premised upon constructivism<sup>1</sup> and a key transformational pedagogical practice<sup>2</sup>. Properly-designed IBB attains all levels of Bloom's learning outcomes<sup>3</sup>. IBB integrally involves the laboratory, but lockdowns and hybrid audiences thereafter necessitated a home-based alternative<sup>4,5</sup>.

## Results

Student performance on tasks demonstrated successful planning and execution of IBB as evidenced by student work (audio-visual media and publications; scan Fig. 1). Statistical analyses yielded three scales, with significantly higher means and large effect sizes (i) for hybrid over kitchen IBB for 'enjoyable and enriching learning experience', and (ii) for hybrid over kitchen and laboratory IBB for 'course workload', but none for 'critical thinking and problem solving' (Fig. 2). Therefore, hybrid IBB provided superior learning engagement and enrichment, coinciding with greater access to the laboratory and topical choice compared to kitchen IBB. The greater course workload for hybrid IBB was attributed to more stringent IBB demands and greater course workload in general upon campus reopening.

**Fig. 1. Student Performance: Inquiry Based Biology @ Kitchen/ Lab**



## Conclusions

Hybrid IBB is still relevant at present as some students remain online and contingencies are required in view of both Covid-19 and monkeypox. Diversifying IBB topics and continued access to the laboratory must be balanced with curriculum workload to establish optimal student learning engagement and experience. Future analyses of qualitative responses are planned to further explain quantitative analyses.

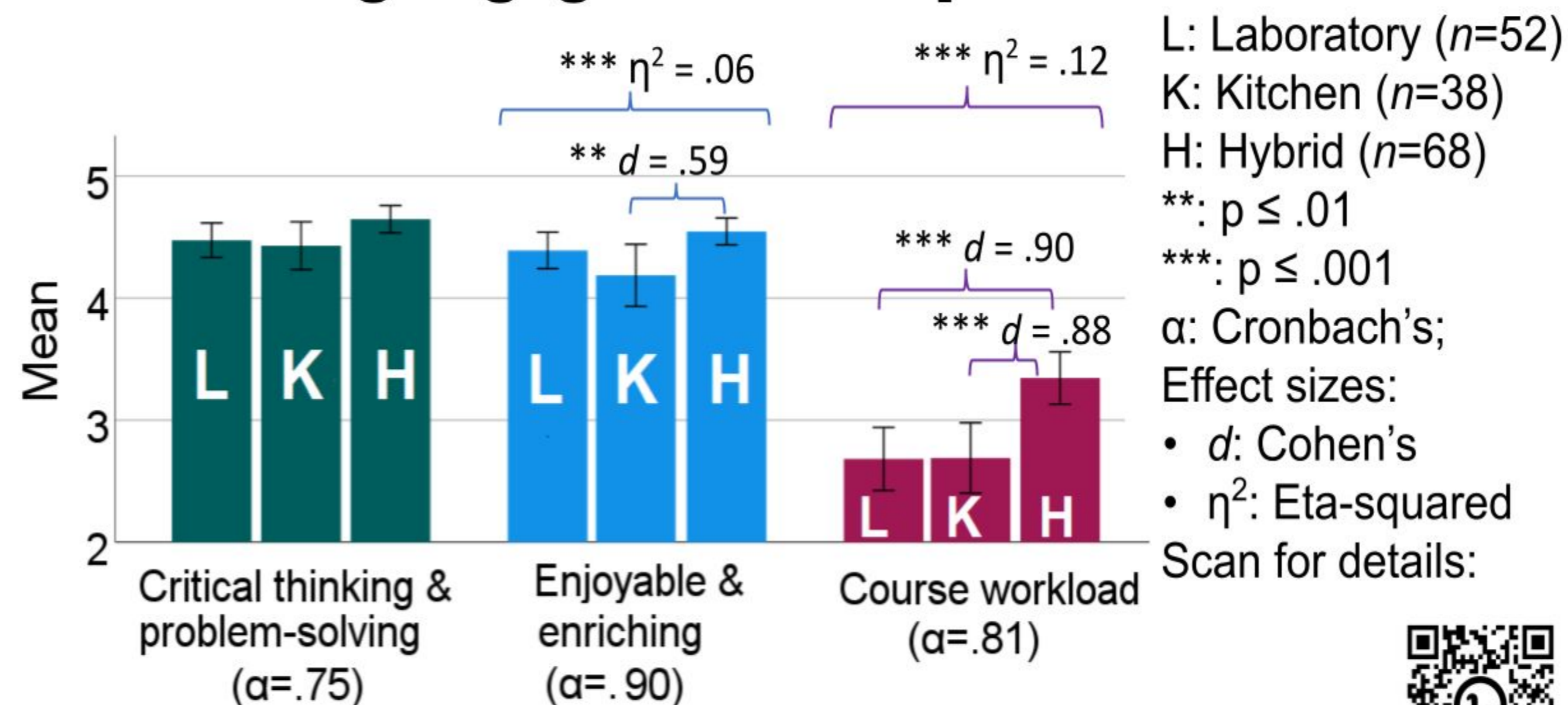
Scan video summary:



## Methodology

Three IBB modes were studied among Grade 12 students ( $n=158$ ): laboratory, kitchen and hybrid (laboratory and/ or kitchen) IBB before, during and after lockdowns, respectively<sup>6</sup>. Google and video applications were used in all IBB modes, with Zoom used for kitchen and hybrid IBB. Quantitative and qualitative responses were gathered<sup>7</sup>.

**Fig. 2. Three Inquiry-Based Biology modes: Learning engagement & experience**



## Literature cited

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