

# INPLASY

## Human-Centered XR Integration for STEM Education in New Zealand: A Systematic Review and Implementation Framework

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### ADMINISTRATIVE INFORMATION

**Support** - No funding received.

**Review Stage at time of this submission** - Completed but not published.

**Conflicts of interest** - None declared.

**INPLASY registration number:** INPLASY202630113

**Amendments** - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 30 March 2026 and was last updated on 30 March 2026.

### INTRODUCTION

**Review question / Objective** To examine the use and impact of Extended Reality (XR) technologies in STEM education in New Zealand.

**Rationale** XR technologies are increasingly used in education, but their application in New Zealand STEM contexts remains limited. This review summarizes existing evidence and identifies key trends and challenges.

**Condition being studied** Application of Extended Reality (XR) technologies (VR, AR, MR) in STEM education in New Zealand.

### METHODS

**Search strategy** Searches were conducted in Web of Science, Scopus, and Dimensions using combinations of XR and STEM education terms with "New Zealand".

**Participant or population** Participants include students and educators involved in STEM education in New Zealand.

**Intervention** Use of Extended Reality (XR) technologies (VR, AR, MR) in STEM education.

**Comparator** Traditional or non-XR teaching methods.

**Study designs to be included** Quantitative, qualitative, and mixed-methods studies.

**Eligibility criteria** Studies focusing on XR in STEM education within the New Zealand context, published in English.

**Information sources** Web of Science, Scopus, Dimensions, and relevant grey literature.

**Main outcome(s)** Learning outcomes and educational effectiveness.

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**Additional outcome(s)** Engagement and implementation challenges.

**Data management** Data were extracted and summarized from included studies.

**Quality assessment / Risk of bias analysis** Study quality was assessed using the Mixed Methods Appraisal Tool (MMAT).

**Strategy of data synthesis** Quantitative and qualitative synthesis methods were used to analyze the included studies.

**Subgroup analysis** Subgroup analyses were conducted where appropriate.

**Sensitivity analysis** Sensitivity analyses were conducted to assess the robustness of the results.

**Language restriction** English only.

**Country(ies) involved** New Zealand.

**Other relevant information** This review was completed prior to registration. Registration is provided to ensure transparency and alignment with journal requirements.

**Keywords** XR; STEM; education; systematic review.

**Dissemination plans** Results will be published in a peer-reviewed journal.

#### **Contributions of each author**

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