Data Visualization Using Augmented Reality for Education: A Systematic Review

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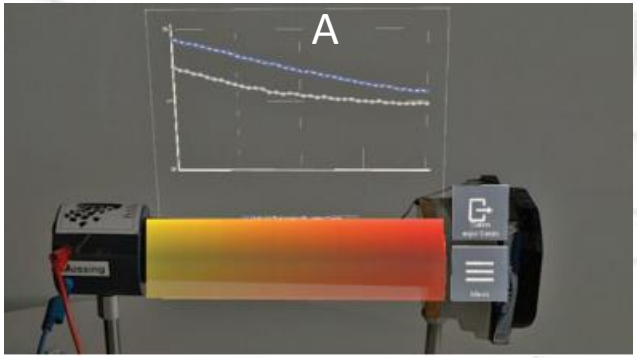
Visualizing data in 2d/3d

C

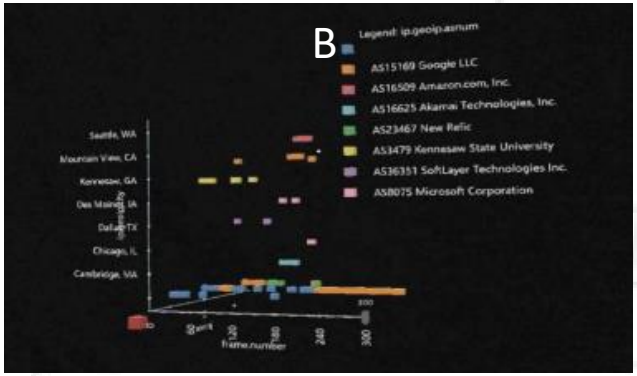
Head mounted devices: https://eagleeyevr.com/vr-headset-lg-g4/

A



P. Knierim, F. Kiss and A. Schmidt, "Look Inside: Understanding Thermal Flux Through Augmented Reality," 2018 IEEE International Symposium on Mixed and Augmented Reality Adjunct (ISMAR-Adjunct), 2018, pp. 170-171, doi: 10.1109/ISMAR-Adjunct.2018.00059.

B



S. North, M. Verma, S. Saffan, V. Orellana, M. Alyward and R. Brooks, "Pedagogical Innovative Research Endeavor: Visualization of Streamed Big Data through Augmented Reality," 2019 SoutheastCon, 2019, pp. 1-6, doi: 10.1109/SoutheastCon42311.2019.9020576.

Research Questions

RQ1: What are the most common target groups where most of the research were utilized on?

RQ2: What is the most preferred AR application type for data visualization? What are the tools and technologies used to create AR applications?

RQ3: What are the most common subjects/ areas that have been covered?

How to find the answers?

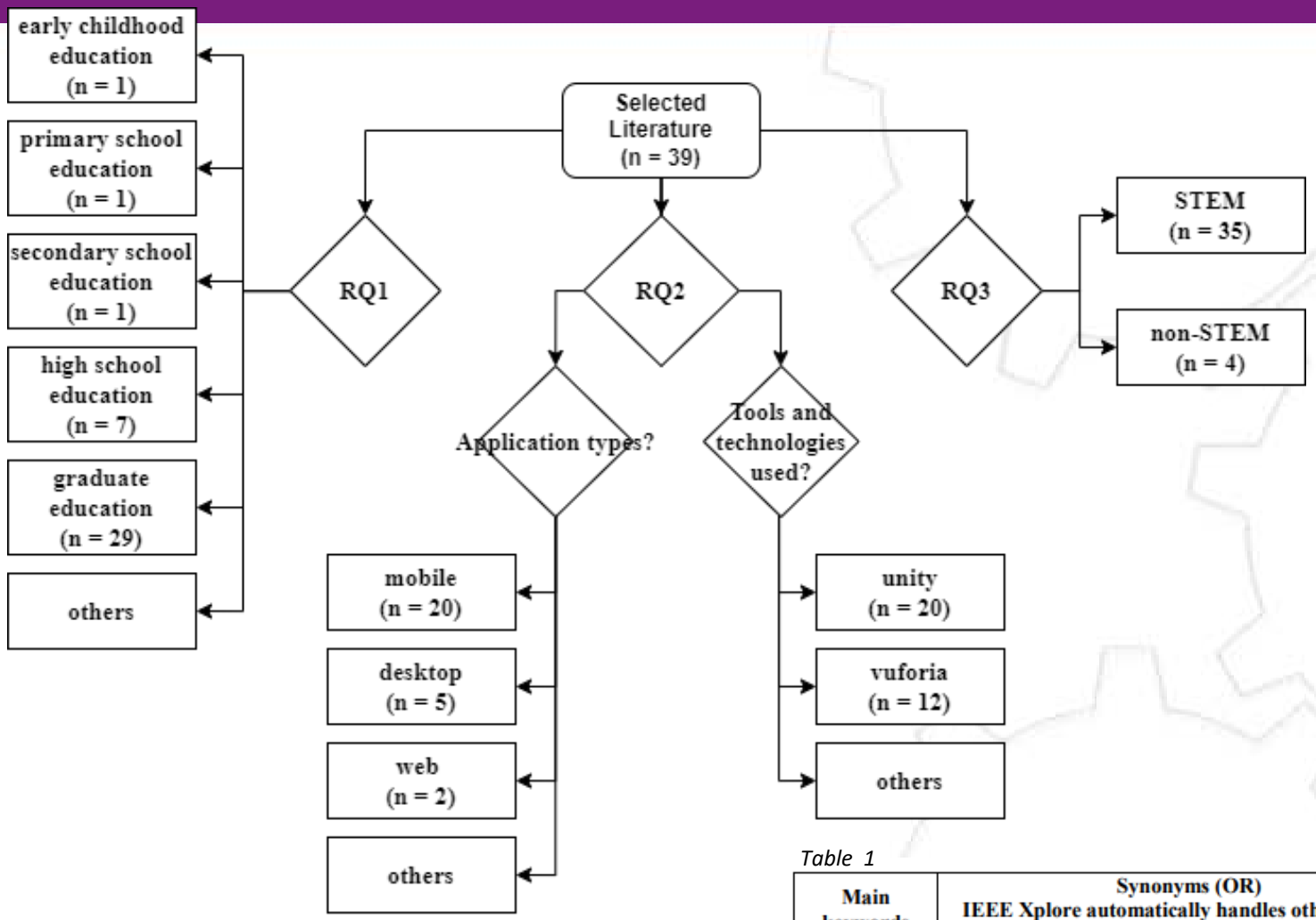
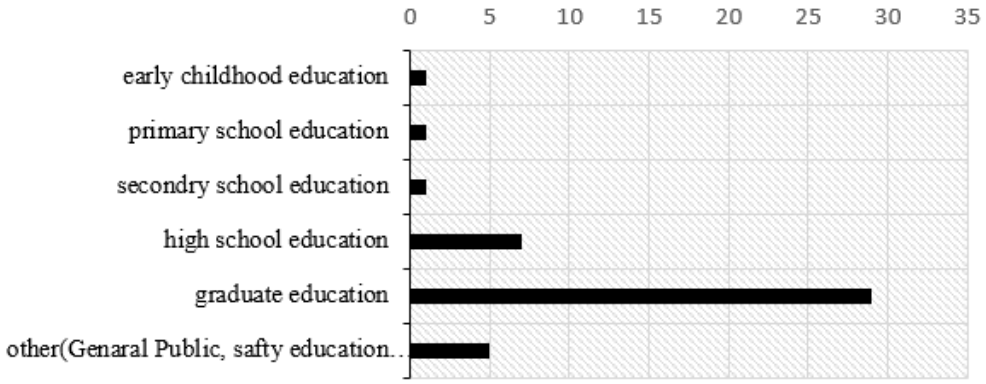


Fig 1

Table 1

Main keywords (AND)	Synonyms (OR) IEEE Xplore automatically handles other types of keyword formations such as capitalization, plural forms, etc.		
augmented reality	AR	-	-
data visualization	visualization	big data visualization	-
education	STEM	teaching	pedagogy

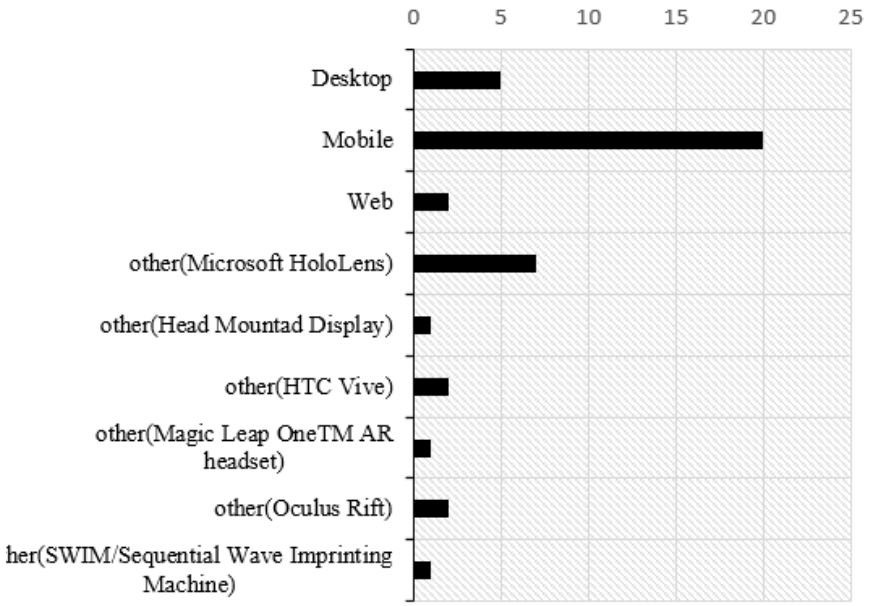
Statistics



	other(Genaral Public, safty education in construction sites)	graduate education	high school education	secondry school education	primary school education	early childhood education
Count	5	29	7	1	1	1

Target groups analysis

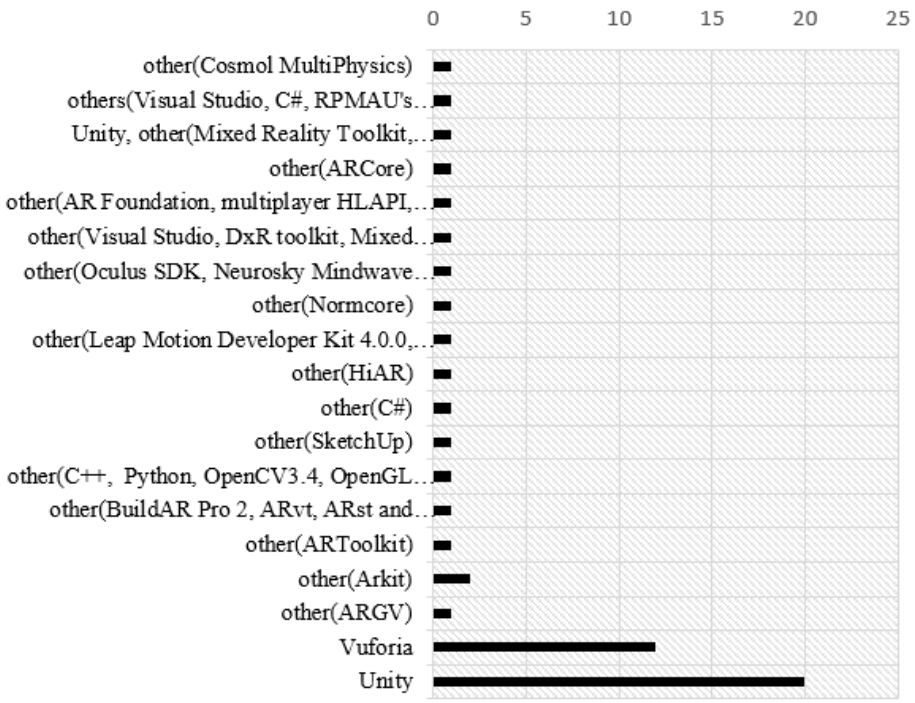
Fig 2



AR application type segmentation

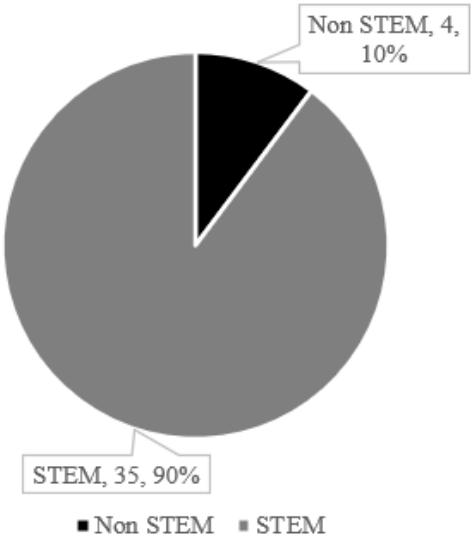
Fig 3

Statistics Cont.



Tools and technologies segmentation

Fig 4



Subject area analysis

Fig 5

Conclusion

	RQ1	RQ2	RQ3
Current direction	Graduate education	Mostly as Mobile applications Technologies Unity, Vuforia	STEM Education
Research gaps	Early childhood education and others stages as well	?	Non-Stem Education

Table 2

Next:
Planning to address the gaps by creating some applications for Non-STEM education.

Acknowledgements:
All the authors in Augmented reality and Education domain