



# An Overview of the Relationship between Spatial Skills and Computing Science

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## ABSTRACT

The relationship between spatial skills and computing science has been well explored in recent years. Several publications across a range of venues have presented work at several levels with many different outcomes. There has also been some exploration of the reason why this relationship exists and what it could mean for computing and STEM education more broadly. This poster aims to summarise all these works and present a cohesive synopsis of spatial skills in computing research to date.

## CCS CONCEPTS

• **Social and professional topics** → **Computing education.**

## KEYWORDS

spatial skills, overview, cognition

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## 1 EXTENDED ABSTRACT

Spatial skills are cognitive skills involving understanding and space and spatial concepts, such as mental rotation, mental transformation (visualising cross-sections of objects or how a 2D flat pattern can fold into a 3D object) and spatial orientation [3]. Spatial skills have been associated with various measures of CS success and achievement, such as module grades [1, 9], GPAs [10] and various CS tests [2, 4, 5]. Some studies have even demonstrated that spatial skills training results in improved CS outcomes [1, 4, 7, 11].

The reason for this relationship has been theorised by some authors, resulting in a broad picture of what role spatial skills play in CS success [6, 8]. They appear to be connected to the use of the visuospatial sketchpad and other neurological and psychological mechanisms which can be recruited to internalise non-verbal information, including processes, structures and operations. In CS, this could include conceptualising systems or formulating an understanding of programs.

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This poster aims to provide an overview of all the work conducted between spatial skills and CS to date. It will provide a broad literature review alongside major theories and possible future work in a format which is accessible and relevant to the UKICER audience. The purpose of the poster is to raise the profile of spatial skills research in CS and to clearly present the current state of play. UKICER's poster format also provides a context to share the scope of existing research with conference participants and explore our community's next steps in this tantalising research.

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