

## Embodied Spatial Cognition in Tangible Computing

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CCS Concepts: • **Human-centered computing** → **Human computer interaction (HCI)**; **Laboratory experiments**;

Additional Key Words and Phrases: Human-computer interaction, tangible interfaces, interaction design, physical computation, embodied cognition, spatial thinking, geospatial modeling

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Table I. Coupling experiment: percent cells

Method	Concentrated flow	Ridges	Valleys
Reference	0.89	2.10	2.90
Digital	1.12	0.69	0.56
Hand	0.80	4.00	1.66
Augmented	0.77	4.13	1.48

Table II. Percent cells with ridges

Method	Reference	Mean	Stdev
Difference	4.27	3.46	3.25

Table III. Difference experiment: percent cells

method	concentrated flow		ridges		valleys	
	reference	mean	reference	mean	reference	mean
difference	1.07	0.73	4.27	3.46	2.96	0.22

Table IV. Water flow experiment: percent cells

method	concentrated flow		ridges		valleys	
	reference	mean	reference	mean	reference	mean
water flow	2.55	1.99	1.18	3.72	4.77	3.86

Table V. Mean minimum distance (ft) of features from reference features

Method	Concentrated flow	Ridges	Valleys
Digital	12916	110419	98806
Hand	10162	24005	676450
Augmented	7121	19599	31401
Difference	25073	35656	114378
Water flow	28321	37918	26166

Table VI. Percent cells

method	concentrated flow		ridges		valleys	
	reference	mean	reference	mean	reference	mean
digital	0.89	1.12	2.10	0.69	2.90	0.56
hand	0.89	0.80	2.10	4.00	2.90	1.66
augmented	0.89	0.77	2.10	4.13	2.90	1.48
difference	1.07	0.73	4.27	3.46	2.96	0.22
water flow	2.55	1.99	1.18	3.72	4.77	3.86