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Handwritten versus digital concept maps: Perceptions of undergraduate medical students

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Dear Editor,

Concept mapping is a recognised active learning strategy that promotes meaningful learning by enabling students to organise and integrate complex information (Al Rashid & Rahman, 2023; Al Rashid et al., 2024). With the increasing integration of digital technologies into medical education, concept maps are created in both handwritten and digital formats. However, comparative evidence regarding students' perceptions of these modalities remains limited. We report findings from a preliminary cross-sectional study comparing undergraduate medical students' perceptions of handwritten versus digital concept maps.

The study was conducted among second-year MBBS students at Saveetha Medical College and Hospital, India, during routine teaching sessions in Pharmacology, Pathology, and Microbiology. Of 250 eligible students, 213 participated (response rate: 85.2%). Students were exposed to both handwritten and digital concept mapping. Perceptions were assessed using a structured questionnaire comprising seven Likert-scale items for each modality, assessing ease of use, conceptual understanding, recall, organisation of information, overall learning experience, time efficiency, and ease of modification, along with one item assessing overall preference. Responses were recorded on a 5-point Likert scale (0–4). As paired scores were non-normally distributed, comparisons were analysed using the Wilcoxon signed-rank test.

Across all domains, handwritten concept maps received higher perception scores than digital concept maps. The overall mean perception score was significantly higher for handwritten maps (2.73 ± 1.16) than for digital maps (2.15 ± 1.20; $p < 0.001$). Overall, 44.1% of students preferred handwritten concept maps, 23.5% preferred digital maps, 28.2% perceived both modalities as equally effective, and 4.2% preferred neither.

The preference for handwritten concept maps may reflect enhanced generative processing, deeper conceptual integration, and reduced extraneous cognitive load. Although digital concept maps offer advantages such as ease of storage and modification, limited familiarity with digital tools and interface complexity may reduce perceived effectiveness. The proportion of students who rated both modalities as equally effective highlights individual variation in learning preferences.

This study is limited by its single-institution, cross-sectional, perception-based design. Important covariates such as prior digital exposure, baseline digital literacy, and learning preferences were not measured, introducing potential confounding. Blinding was not feasible, as participants were aware of the modality used, and response bias cannot be excluded.

In conclusion, handwritten concept maps were perceived as more effective than digital concept maps. Structured training in digital concept-mapping tools may enhance their educational value and support a blended instructional approach.

Notes on Contributors

Sulthan Al Rashid contributed to the conceptualisation of the study, manuscript drafting, critical revision, and final proofreading.

Anbarasu Kanchana Mala assisted with data collection and contributed to manuscript writing.

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Declaration of Interest

The authors declare no conflicts of interest.

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