

Analyzing the Dimensions and Components of Experimental Science Curricula Based on the Application of Artificial Intelligence

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Abstract

The present study aimed to investigate the dimensions and components of experimental science curricula based on the application of artificial intelligence, in order to provide a comprehensive picture and perspective of this field. For this purpose, a qualitative meta-synthesis method was used. Research data were searched and collected using Roberts' six-stage model between 2020-2024. The scope of the research was all article that were presented on the research topic and related fields in specialized and scientific databases. The research sample was 30 articles, which were selected purposefully and based on thematic, content, and theoretical saturation monitoring of the data. The research data were analyzed at this stage using thematic content analysis. In order to examine the reliability and trustworthiness of the findings, the criteria of the researcher's self-review and the peer review method (rater agreement coefficient) were also used. By analyzing the data, the dimensions and components of the experimental science curricula based on the application of artificial intelligence were organized into six dimensions, 17 axes, and 78 categories, including environment and context (effective sectoral and cross-sectoral culture, professional development of human resources, technical infrastructure); goals (appropriateness and integration, alignment and interaction, formulation process); content (personalization, needs-based, empowering); teaching-learning strategies (based on a constructivist approach, situational and contingency strategies), resources and facilities (suitability with goals, processes and organizational procedures, system characteristics); and evaluation (providing smart assignments, reducing unproductive competition in evaluation, continuous supervision and monitoring).

Keywords: experimental science education, artificial intelligence, curriculum

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