

Pedagogical Content Knowledge for Nature of Science: In Search for a Meaning for the Construct

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Abstract : During the past twenty years, there has been an increased interest by science educators in researching and developing teachers' pedagogical content knowledge for teaching the nature of science (PCKNOS). While there has been this surge in interest in the idea of PCKNOS, there has not been a common understanding among NOS researchers as to how exactly the PCKNOS concept should be construed. In this paper, we analyse and evaluate published accredited journal articles on PCKNOS research. We also draw from our teaching experiences. The major points of foci are the researchers' presentations of SMKNOS and their centres of attention regarding the elements of PCKNOS. Our content, cluster analysis, and evaluation of the studies on PCKNOS reveal that most researchers have presented SMKNOS in the form of a heuristic or a set of heuristics (targeted NOS ideas) to be mastered by teachers or learners. Furthermore, we found that most of the researchers' attention has been on developing and recommending teacher pedagogical practices for teaching NOS. From this, we synthesize and propose a subject knowledge content structure and a pedagogical approach that we believe is relevant and appropriate for secondary school and science teacher education if the goal of science education for scientific literacy is to be achieved. The justification of our arguments is rooted in tracing and unpacking the origins and meaning of pedagogical content knowledge (PCK). From our analysis, synthesis, and evaluation, as well as teaching experiences, we distil and construct a meaning for the PCKNOS construct.

Keywords : pedagogical content knowledge, teaching, nature of science, construct, subject matter knowledge

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