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Problem solving has traditionally been one of the principal research areas for artificial intelligence. Yet, although artificial intelligence reasoning techniques have been employed in several product support systems, the benefit of integrating product support, knowledge engineering, and problem solving, is still unclear. This paper studies the synergy of these areas and proposes a knowledge engineering framework that integrates product support systems and artificial intelligence techniques. The framework includes four spaces; the data, problem, hypothesis, and solution ones. The data space incorporates the knowledge needed for structured reasoning to take place, the problem space contains representations of problems, and the hypothesis space utilizes a multimodal reasoning approach to produce appropriate solutions in the form of virtual documents. The solution space is used as the gateway between the system and the user. The proposed framework enables the development of product support systems in terms of smaller, more manageable steps while the combination of different reasoning techniques provides a way to overcome the lack of documentation resources.