

## Learning Experiences in the Novice-Expert Liminal Space

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This paper reports on new research into the learning experiences of novices and experts. The research explored the novice-expert liminal space to study the threshold concepts involved in learning to become an expert. Grounded theory methods were used to elicit evidence of critical concepts present in the learning experiences; this approach allowed categories and themes to emerge from the data and proved to be an original and effective methodology for exploring threshold concepts. The study's research design also underscored the importance, when undertaking similar studies, to focus on the learners themselves in data collection when exploring learning experiences.

The practice site for the research was search expertise and the study explored knowledge that could transcend both the particulars of an individual search engine (features, commands, and the like) and, second, the subject area of the database content. This domain was of particular interest as search expertise is of cross-disciplinary relevance and the content of searching can belong to any academic field or subject focus. The study further focused on the liminality between the highly proficient novice and the expert searcher. "Expert searchers" in today's information environment include reference librarians, information architects, university faculty who teach advanced search, and other professionals in a variety of information-intensive settings. Their experiences are characterized by a profound understanding of information concepts and content *and* they have an agile ability to apply this knowledge to both interacting with and having an impact on the information environment, often including having a role in the information experiences of others. The study closely examined novice-expert literature (Dreyfus, 1980; 2004; Simon & Chase, 1973; Ericsson, 1993; 2006), and considered practices relevant to the learning experiences of experts, such as how they: structure knowledge (Bransford, 1999), process ambiguous information (Berliner, 1994), solve problems and use representations (Ericsson, 2000), and use reflection when learning (Schön, 1983).

The study's sample of 20 participants drew from two population groups: graduate students pursuing advanced coursework in online searching and highly experienced professional searchers with an average of 32 years relevant experience, such as information science professors and search engine developers, who were recalling their own learning experiences. Using these two groups allowed a nuanced understanding of the experience of learning to search in expertlike ways, with data from those who perform at a very high level as well as those who may be actively developing expertise. The study used semi-structured interviews, search tasks with think-aloud narratives, and talk-after protocols. Searches were screen-captured with simultaneous audio-recording of the think-aloud narrative. Data were coded and analyzed using NVivo software and manually. Once theoretical saturation was achieved in accord with grounded theory method, during the final stage of analysis the coded data were viewed through lenses of existing theoretical frameworks, primarily threshold concept theory, and to discover themes that represented the "meaningful essence that [ran] through the data" (Morse, 2008, p. 927).

Themes that emerged provided evidence of four concepts that had the characteristics of threshold concepts: *information environment*: the total information environment is perceived and understood; *information structures*: content, index structures, and retrieval algorithms are understood; *information vocabularies*: fluency in search behaviors related to language, including natural language, controlled vocabulary, and finesse using proximity, truncation, and other language-based tools.

The fourth threshold concept was *concept fusion*, the integration of the other three threshold concepts and further defined by additional properties. In addition to the threshold concepts were findings not concept-based, including *praxes* and *traits* of expert searchers. A model of search expertise was proposed with the four threshold concepts at its core that further encompassed these traits and praxes that emerged. This allowed the research to present an integrated model of the novice-expert space for the practice site of search expertise. In addition, melding understandings from novice-expert research and threshold concept theory literature (Meyer & Land, 2003; Cousin, 2010), the study found ontological shift to be a critical component of the model, in addition to critical changes in discourse (Flanagan & Smith, 2008).

The research provides a deeper understanding of the transformative learning experiences involved in the acquisition of expertise. It also suggests areas for further research into the learning that takes place in the novice-expert liminal space and raises questions for exploration, such as, Do liminal learning experiences take place for the novice-expert learner that mark threshold knowledge for a given profession or discipline? The study has implications for understanding the novice-expert space more broadly and offers an effective methodology in grounded theory for exploring threshold concepts.

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