

| Search Stage  | Search behaviours indicative of learning, or increasing domain expertise  |
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| <b>Query (re)formulation</b>  | <ul style="list-style-type: none"> <li>- Increase in the <i>number</i> and <i>specificity</i> of query terms</li> <li>- Increase in number of synonyms</li> <li>- Decrease in number of reformulated queries</li> </ul>   |
| <b>Search Engine Results Page (SERP) examination</b><br><i>(Source Selection)</i> | <ul style="list-style-type: none"> <li>- Increased clarity in relevance criteria = increased ability to distinguish between relevant and non-relevant results</li> <li>- Decrease in the number of search results viewed (supported by Mao et al. (2018), contrasted by White et al. (2009))</li> <li>- Decrease in the proportion of partially relevant results viewed, and increase in the number of relevant results viewed</li> <li>- Average time for assessing a search result decreases</li> </ul>   |
| <b>Content Page examination</b><br><i>(Interaction with sources)</i>              | <ul style="list-style-type: none"> <li>- Increase in the amount of information-use from viewed content pages in the learning outcome artefact (summary, project report, exam answers, etc.)</li> </ul> <p><u>Knowledge Assimilation</u>: addition of new information to existing knowledge structure</p> <ul style="list-style-type: none"> <li>- Focus on factual and specific information</li> <li>- Refining output with factual information</li> <li>- Revisiting content pages for information initially overlooked</li> </ul> <p><u>Knowledge Restructuring</u>: large changes or replacement of concepts and their relations in knowledge structure</p> <ul style="list-style-type: none"> <li>- Focus on background and conceptual information; notes taken on themes and ideas</li> <li>- Ideas are related and combined for a focus, in the outcome</li> </ul> <p><u>Knowledge Tuning</u>: small changes in scope and meaning of concepts and their relations in knowledge structure; no replacements</p> <ul style="list-style-type: none"> <li>- Focus on procedural and specific information</li> <li>- Identification of information to support and refine focus</li> </ul> |
| <b>Overall search session</b>   | <ul style="list-style-type: none"> <li>- Decreased time per search session</li> <li>- Decrease in variability of search tactics</li> <li>- Increase in the diversity of websites visited within a subject area (increase in the average number of unique top-level websites on a SERP or across clicked documents)</li> <li>- Increase in focus of exploration (e.g., the degree to which a SERP is covered by a single topic)</li> <li>- Search path is more ‘branchy’ – returning to a previously visited point and then following a new unexplored direction) (White et al., 2009)</li> </ul>  |