This paper focuses on usability evaluation of web search engines using informational query models. The study adapted Joo, Lin and Lu (2011) usability evaluation model as theoretical foundation for undertaking the usability study. The research designed used for the study was laboratory experimental design in which a study population of five (5) web search engines, namely: Ask.com, Bing, Excite, Google and Yahoo! web search engines, were selected for the experiment. Twenty-one (21) master’s degree students from the Department of Library and Information Technology, Federal University of Technology Minna, Nigeria were selected as observation participants, which were trained and guided to carry out the experiment. The instrument used for data collection was an observation template used to record the observations made by the participants. The instrument contains five (5) different informational query model examples drawn from Library and Information Services used to test the web search engines’ usability performances using six(6) usability effectiveness constructs/statements developed by Joo, Lin and Lu (2011). The study revealed that there is no significant difference in usability effectiveness between web search engines using informational query models. i.e., overall the web search engines performed well but at different levels of performances.Specifically, Google has the highest performance on usability effectiveness using informational query model, as reflected in its mean score of 3.57. Yahoo! ranked second with a mean score of 3.46, the third is Ask.com which has the mean score of 3.42, followed by Bing with a mean score of 3.08 and lastly Excite which has a mean score of 2.64. This study will enlighten students, educators, librarians and researcher on the appropriate web search engines to use when searching for relevant information online to accomplish their academic engagements/ assignments. In essence, this study will reveal the best web search engines among those selected for this study, to improve the quality of information at their disposal, and by extension improve the quality of their research works, and serve as a beacon to guide researchers out of the maze of the huge amount of information available on the Internet.