

國立清華大學 100 學年度碩士班入學考試試題

系所班組別：資訊系統與應用研究所 甲組（資訊系統管理與生物資訊組）

考試科目（代碼）：英文(2303)

共 4 頁，第 1 頁 *請在【答案卷、卡】作答

Part 1: Directions (Read the following article and answer the questions using FULL SENTENCES in ENGLISH).(40%)

Put down those science text books and work at recalling information from memory. That's the shorthand take away message of new research from Purdue University that says practicing memory retrieval boosts science learning far better than elaborate study methods.

"Our view is that learning is not about studying or getting knowledge 'in memory,'" said Purdue psychology professor Jeffrey Karpicke, the lead investigator for the study that appears today in the journal Science. "Learning is about retrieving. So it is important to make retrieval practice an integral part of the learning process."

Educators traditionally rely on learning activities that encourage elaborate study routines and techniques focused on improving the encoding of information into memory. But, when students practice retrieval, they set aside the material they are trying to learn and instead practice calling it to mind.

"In prior research, we established that practicing retrieval is a powerful way to improve learning," said Karpicke. "Here we put retrieval practice to the test by comparing its effectiveness to an elaborative study method, specifically elaborative studying by creating concept maps."

Concept mapping requires students to construct a diagram--typically using nodes or bubbles--that shows relationships among ideas, characteristics or materials. These concepts are then written down as a way of encoding them in a person's memory. The researchers say the practice is used extensively for learning about concepts in sciences such as biology, chemistry or physics.

In two studies, reported by Karpicke, a total of 200 students studied texts on topics from different science disciplines. One group engaged in elaborative study using concept maps while a second group practiced retrieval; they read the texts, then put them away and practiced freely recalling concepts from the text.

After an initial study period, both groups recalled about the same amount of information. But when the students returned to the lab a week later to assess their long-term learning, the group that studied by practicing retrieval showed a 50 percent improvement in long-term retention above the group that studied by creating concept maps.

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"Our view is that learning is not about studying or getting knowledge 'in memory,'" said Purdue psychology professor Jeffrey Karpicke, the lead investigator for the study that appears today in the journal *Science*. "Learning is about retrieving. So it is important to make retrieval practice an integral part of the learning process."

This, despite the students own predictions about how much they would actually remember. "Students do not always know what methods will produce the best learning," said Karpicke in discussing whether students are good at judging the success of their study habits.

He found that when students have the material right in front of them, they think they know it better than they actually do. "It may be surprising to realize that there is such a disconnect between what students think will afford good learning and what is actually best. We, as educators, need to keep this in mind as we create learning tools and evaluate educational practices," he said.

The researchers showed retrieval practice was superior to elaborative studying in all comparisons. "The final retention test was one of the most important features of our study, because we asked questions that tapped into meaningful learning," said Karpicke.

The students answered questions about the specific concepts they learned as well as inference questions asking them to draw connections between things that weren't explicitly stated in the material. On both measures of meaningful learning, practicing retrieval continued to produce better learning than elaborative studying.

Karpicke says there's nothing wrong with elaborative learning, but argues that a larger place needs to be found for retrieval practice. "Our challenge now is to find the most effective and feasible ways to use retrieval as a learning activity--but we know that it is indeed a powerful way to enhance conceptual learning about science."

(Extracted from the NSF Press released, 2011)

P1: Based on the research observation, can you explain the reasons that some students having good grades in schools have difficulties to perform well in the "Big" Exams? (20%)

P 2: Please explain the reasons that elaborative studying cannot outperform retrieval practice based on Prof. Karpicke's discussion. (20%)

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Part 2: Directions (Read the following article and answer the questions using FULL SENTENCES in ENGLISH).(30%)

Information technology (IT) is "the acquisition, processing, storage and dissemination of vocal, pictorial, textual and numerical information by a microelectronics-based combination of computing and telecommunications". The term in its modern sense first appeared in a 1958 article published in the *Harvard Business Review*, in which authors Leavitt and Whisler commented that "the new technology does not yet have a single established name. We shall call it information technology."

IT spans wide variety of areas that include but are not limited to things such as processes, computer software, computer hardware, programming languages, and data constructs. In short, anything that renders data, information or perceived knowledge in any visual format whatsoever, via any multimedia distribution mechanism, is considered part of the domain space known as Information Technology (IT).

IT professionals perform a variety of functions (IT Disciplines/Competencies) that range from installing applications to designing complex computer networks and information databases. A few of the duties that IT professionals perform may include data management, networking, engineering computer hardware, database and software design, as well as management and administration of entire systems. Information technology is starting to spread farther than the conventional personal computer and network technology, and more into integrations of other technologies such as the use of cell phones, televisions, automobiles, and more, which is increasing the demand for such jobs.

In the recent past, the Accreditation Board for Engineering and Technology and the Association for Computing Machinery have collaborated to form accreditation and curriculum standards for degrees in Information Technology as a distinct field of study as compared to Computer Science and Information Systems today. SIGITE is the ACM working group for defining these standards. The Worldwide IT services revenue totaled \$763 billion in 2009.

(From Wikipedia, the free encyclopedia)

Q1: What are the differences between IT and Computer Science? (15%)

Q2: Describe what traditional IT professionals did in the past, in recent years, and predict what future IT professionals will perform. (15%)

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Part 3: Directions (Translate the following article into Chinese Mandarin).

英翻中(30%)

The educational system in Taiwan is the responsibility of the Ministry of Education of Taiwan. The system in Taiwan produces pupils with some of the highest test scores in the world, especially in mathematics and science. It has been criticized for placing excessive pressure on students and eschewing creativity in favor of rote memorization. Recent educational reforms intended to address these criticisms are a topic of intense debate in Taiwan.

Although current law mandates only nine years of schooling, 95% of students go on to high school, trade school or college. President Ma announced in January 2011 that the government would begin the phased implementation of a twelve-year compulsory education program by 2014.

(From Wikipedia, the free encyclopedia)