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Impact of Automated Blood Testing:

COMPUTER ENABLES TECHNOLOGISTS TO BOOST LAB PRODUCTIVITY

LEXINGTON, Ky., July 16 ... Computer processing of blood test results at the University of Kentucky Medical Center here has enabled laboratory technologists to increase the number of tests performed each month from 30,000 to 45,000.

Prior to the implementation of the automated blood testing procedure, technologists like Miss Jane Hagan, manually correlated the output of autoanalyzers and other laboratory instruments to complete the analysis of samples.

Not only is manual correlation time consuming, but the possibility always exists of an error occuring in transcription.

Computer processing of this information has eliminated the possibility of clerical error resulting in invalid reports.

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TRINITY UNIVERSITY
SAN ANTONIO, TEXAS

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HOW DOES MAN LEARN?

PROFESSOR SEEKS ANSWER WITH IBM COMPUTER

SAN ANTONIO, Texas, Oct. 26.... A Trinity University professor here is off on the trail of one of nature's best-kept secrets.

The mystery to be solved is how does man learn? The sleuthing will be done with an IBM computer.

"Man has learned much about himself over the ages, but the learning process itself is still unexplained," said Dr. Frederick Bremner, professor of psychology at Trinity.

"Science has demonstrated that the brain of all animals receives signals from each sense organ, but how the brain reacts to these signals is still unknown."

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Dr. Bremner is conducting experiments with rats to determine exactly what happens physically within the brain when it receives stimuli. When his experimentation is completed, he plans to investigate the relationships between his findings and the processes involved in human learning.

The computer -- an 1800 data acquisition and control system -- is being used to monitor the experiments. The system collects and processes vast amounts of data taken during each experiment and makes the results available to the scientist via a high-speed printer or a digital plotter.

Sensors placed in the brain of the rats are connected by wire to the 1800. During an experiment -- for example, a test of the rat's reaction to a light going on and off -- the sensors pick up the changes in electrical pulses which traverse the brain's network of nerves. As these physical changes occur, the sensors relay the information to the computer.

After processing the data, the computer is used to compare the reactions of many rats in similar experiments to see if there is a pattern to their responses.

The experiments Dr. Bremner has conducted at Trinity thus far support the prevailing belief of most researchers -- that particular types of behavior result in predictable patterns of physical changes in the electrical system of the brain.

Experiments using less sophisticated equipment indicated the same result, but the data handling capability of the 1800 system processed 1,000 pieces of complex data in ten seconds, and did it unerringly -- a task which would have taken up to three weeks manually.

"In a sense, we are trying to map the brain," according to Dr. Bremner. "For years, researchers have studied the brain from the standpoint of description rather than functionally as we are.

"We hope to learn many things. For example, we know information is stored in cells of the brain, but we don't know what part electrical impulses and chemical factors play in this process. We also know very little about the relationship of one part of the brain to another. It would be impossible to even consider attempting to chart an organ of such infinite complexity without the computer."

Trinity University is the co-educational university of the Synod of Texas, United Presbyterian Church in the U. S. A. It has 2,000 undergraduates and 500 graduate students, and will celebrate its centennial in 1969.

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11/2 '67

From:
News Bureau
Indiana University
306 N. Union St.
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HOW DO HUMANS LEARN?

BLOOMINGTON, Ind., Nov. 26 . . . Psychologists at Indiana University are conducting computer-assisted experiments to help fathom the baffling question of how human beings learn.

Dr. Frank Restle, professor of psychology, said the two major areas of investigation are memory and concept formation. The study at the University's Mathematical Psychology Laboratory is financed by a grant from the National Institute of Health.

"It is apparent that mankind's ability to solve problems is limited, not so much by an inability to do the work, as by an inability to discover the correct action needed," Dr. Restle said. "Our aim is to understand human thought processes, with the hope that this will lead to more effective teaching. Although we are not educational researchers, we do feel the teaching of the future will depend on the knowledge we have of the thinking process."

The laboratary is equipped with a powerful IBM 1800 computer, six television-like visual display terminals linked to the computer, and o closed circuit television system with five small TV receivers. Respanses to the various experiments are fed directly to the computer through University designed push-button answer boxes.

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Dr. Restle and Dr. James Greeno, an associate professor, are co-investigators in the study of memory. Dr. John Castellan, an assistant professor, is responsible for the study of concept formation, the base for human judgment making.

One of the lab's experiments is in short-term memory. "This is the kind of memory," Dr. Restle explained, "which enables you to look up a number in a telephone book and retain it long enough to make your call."

Subjects in this experiment, seated before small television receivers, view an image of several non-related numbers and letters. After a measured period of time, the image is replaced by a single number or letter and the subject is asked if that symbol appeared in the original series.

His responses, through simple "yes"-"no" push buttons, and reaction times, are fed directly into the computer. Data are stored there for later tabulations and analysis.

"We find college students--our usual subjects--do not merely try to store information, the way a computer might, but rather seek a pattern which somehow will make the information meaningful," Dr. Restle said. "If they can not find a pattern, they very often will try to construct one.

"This leads us to believe that human beings have very little 'passive' memory. It indicates most recollections are regenerative, that is, constructed by a thought process from stored abstract concepts.

"Many modern thinkers make a contrast between 'creative thought' and 'passive memory', and think of memory as relatively 'unintelligent'. We have come to question whether human memory is a mechanical, unthinking process."

Dr. Greeno's major study, also in the field of memory, studies the way in which subjects organize and categarize information.

The subjects in this experiment view images which are generated by the computer and shown on visual display terminals.

"A set of categories is given to the subject," Dr. Greeno said, "and his task is to organize a list of words which appear on the display screen into the appropriate categories. He also is asked to organize the words into new categories. For example, the word 'bone' can be classified with the word 'snow' under the category of 'white'."

Dr. Greeno said experimental results indicate that subjects tend to construct memory patterns.

"I believe people 'monitor' incoming information, relate it to other data in the memory by linking it to an existing pattern, and thereby conserve 'memory space'," he said.

"Unlike a computer, people do not often memorize isolated bits of information."

The third researcher, Dr. Castellan, conducts experiments in the area of concept formation.

"I prefer to call it 'concept formation in an uncertain world'," he said. "It is, in fact, a study of how people make judgments based on cues--or information--which require classification."

In this experiment, the computer controls a slide projector which presents images with common dimensions of size, color, shape, quantity, and so forth. The subject in the experiment classifies the images through the push button device and his responses are fed back to the computer.

"The computer enables us to introduce a 'probabilistic' factor which enriches the experimental situation and makes it more representative of the natural human environment," Dr. Castellan explained.

"It is this capability which I feel makes the laboratory work far more meaningful in the context of the real environment outside the laboratory.

"These experiments," he said, "will help us better understand the decision making process. By continually measuring and analyzing experimental data, we will build toward a theory which may some day affect teaching methods."

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