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Research Problem Sensitivity:
A Professional Recruitment Criterion

Many professional degree candidates possess unusual ability to readily recognize and conceptualize significant professional research problems. Others lack this ability. To identify crucial experiential and psychological correlates of problem sensitivity, the author contrasted a problem sensitive group with a relatively insensitive group of professional degree candidates. Results indicated that the problem sensitive individuals were on the average older, had attended more prominent undergraduate institutions, had majored in problem-oriented disciplines, had a higher level of achievement in the social sciences, and were generally described by others as flexible, resourceful, and adaptable individuals. Problem sensitivity might well be used as one professional recruitment criterion.

LIBRARY SCHOOL INSTRUCTORS are confronted time and time again with a common but rather perplexing phenomenon. It is that many professional degree candidates appear to possess some sixth sense that permits them to select, with relative ease, a professional-level research problem suitable for investigation and reporting in the form of a master's project, whereas other professional degree candidates, though intelligent and conscientious, are slow to if not incapable of recognizing or proposing a problem suitable for research investigation.

What accounts for these individual differences in ability to recognize and confront significant research problems? Have all of the theoretical and practical questions of library and information science been answered? This can hardly be answered in the affirmative. A staggering number of pragmatic operational and theoretical questions have yet to be dealt with. Could it be that the abundance of existing professional journal articles leaves some candidates with the feeling that no "original" problems are left to investigate? Perhaps this feeling does exist, but ideas permute more readily than do notes on a music scale, and no intelligent individual would assert that all the music that *can* be composed *has* been composed. Numerous problems await investigation. Nor is originality any longer regarded as *the* foremost criterion to be blindly and stringently applied in the selection of a research problem for investigation.

To attempt to determine why some individuals possess the ability to recognize significant research problems, the author conducted a small-scale investigation, the results of which are reported in this paper. The findings are admittedly based on limited samples and therefore are suggestive rather than definitive. It is hoped that the findings may serve to stimulate thinking about which personality characteristics will be most desired in librarianship and information science in the next few years. The challenges we face will require the recruitment of

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imaginative, problem-sensitive individuals who see beyond the clerical function.

PROBLEM SENSITIVITY

Many people have recognized that problem recognition requires considerable thought and effort. Albert Einstein stated, "The formulation of a problem is far more often essential than its solution, which may be merely a matter of mathematical or experimental skill."[1] Northrup states—

Again and again investigators have plunged into a subject matter, sending out questionnaires, gathering a tremendous amount of data, even performing experiments, only to come out at the end wondering what it all proves, and realizing after years of industry and effort that the real difficulty has slipped through their fingers.[2]

Mackworth, writing on originality, points out the need for professionals who can find problems or raise questions. Those who can find problems, he feels, are scarce, and problem-finding is generally more important and more difficult than problem-solving. "Problem solving is a choice between existing programs or sets of mental rules—whereas problem-finding is the detection of the need for a new program based on a choice between existing and expected future programs."[3] His observations are consistent with the fact that many students—graduate and undergraduate alike—have a difficult time selecting a research problem.

Problem recognition can perhaps be treated within the broader topic of "originality," or under the still broader topic of "creativity."

Creative people have been generally characterized in study after study as possessing considerable autonomy, self-direction, high ego-strength, a liking for abstract thinking, tolerance of cognitive ambiguity, and superior general intelligence—among many other factors.[4] But these characteristics do not necessarily serve to describe problem-finders, because many indexes of creativity are based on problem-solving and productivity instead. Nevertheless, it would be difficult to assert that problem-finding does not involve a creative response of some sort.

What constitutes a problem? Two definitions follow:

An unsettled matter demanding solution or decision and requiring unusually considerable thought or skill for its proper solution or decision. . . . a source of considerable difficulty, perplexity or worry. . . . a cause of trouble or distress.[5]

A situation in which, knowing certain of the elements, it is desired or required that the others be ascertained.[6]

Many other definitions emphasize a problem's thwarting and frustrating effect, or the state of disequilibrium it causes. But these definitions do not seem adequate, in that a person might not have awareness of an existing problem. A man might not know that he has a health, marital, or financial problem; scientists might not realize that they are under the bad influence of an untrue theoretical concept that serves as if it were true. Most definitions of the term "problem" appear to be *post hoc*. According to these definitions, a problem becomes a "problem" when its impact is felt, not when it develops. This matter is discussed further in the final section.

[1] S. J. Parnes and H. F. Harding, (eds.). *A Source for Creative Thinking.* (New York: Wiley, 1962), p. 20.
[2] F. S. C. Northrup, *The Logic of the Sciences and the Humanities.* (New York: Macmillan, 1947), p. 1.
[3] N. H. Mackworth, "Originality," *American Psychologist*, XX (January 1955), 57.

[4] C. W. Taylor and F. Barron, *Scientific Creativity: Its Recognition and Development.* (New York: Wiley, 1963), pp. 385-86.
[5] J. Stein, *The Random House Dictionary of the English Language.* (New York: Random House, 1966).
[6] H. B. English and A. C. English, *A Comprehensive Dictionary of Psychological and Psychoanalytical Terms.* (New York: Longmans, Green, 1958).

METHOD

Thirty-three research problem statements were submitted by students in the graduate school of librarianship at the University of Denver as preliminary proposals for their master's degree projects. These research problem statements were assessed by two experienced researchers on a specially constructed "Research Problem Recognition Scale." Resulting numerical scores were assigned to each problem statement. The two scores for each individual were then added together and resulting data were analyzed. The seven highest scoring students and the seven lowest scoring students provided two groups of subjects respectively for further study. The high scorers comprised the "High R" (Recognition) group while the "Low R" group consisted of the seven low scorers.

The school's records contained essential data on each student, including information on age, scholastic achievement, Graduate Record Examination scores, and personality evaluation forms submitted by friends and former employers. These records provided information from which judgments about their problem recognition ability could be made.

The records of the High R group were analyzed to discern what experiential factors and characteristics seemed to underlie and promote the ability to recognize potential research problems. Conversely, records of the Low R groups were examined to discern which characteristics and background factors impeded or did not promote problem recognition ability. Characteristics which suggested sharp differentiation between the two groups, and which were instrumental in forming a High R and a Low R profile were then more systematically investigated.

The problem recognition scale below was developed for use in this study and served as a standard against which to assess the research problem proposals submitted by students. The various criteria listed in the scale should not be regarded as mutually exclusive; there is some obvious overlap between two or more of the criteria. However, each criterion was regarded as sufficiently important to warrant differentiation from other criteria and justify its inclusion in the scale. The main purpose of the scale is to provide a more objective, quantitative standard against which to assess the research problem proposals, and hopefully, to differentiate the more problem-sensitive from the less sensitive individuals.

RESEARCH PROBLEM RECOGNITION SCALE

Problem Conceptualization. Does the problem statement clearly indicate that all aspects of the problem have been recognized? Is only one small aspect of a larger problem treated, to the neglect of getting at the "core" of the problem? Or conversely, is a large, nebulous, and unanalyzed problem evidenced by superficial description?

Inadequately   Well
conceptualized 01234567 conceptualized

Theoretical Relevance. Are theoretical implications of the problem seen? Would the problem, if solved, tie together large amounts of data, bring new insights, or reconstellate an area of knowledge? Would a solution serve to guide action and thought? Would an answer to the problem go beyond the limits of verified knowledge, revealing new ideas and relationships? Is the problem related to significant issues?

Low   High
theoretical   theoretical
relevance   0 1 2 3 4 5 6 7   relevance

Prognostic–Predictive Value. Would the problem if solved, help clarify the course of future events or help to reduce uncertainty about the future, thus clarifying alternatives? Would a solution possess heuristic value, guiding and stimulating future research? Would solu-

tion of the problem assist in planning for the future?

No prognos-   High prog-
tic value   0 1 2 3 4 5 6 7   nostic value

Problem Intensiveness. Is the problem apparently serious and pressing?

Problem is   Problem is
trivial   0 1 2 3 4 5 6 7   serious

Problem Duration. Has the problem persisted, or is it likely to persist, through an extended time period?

Highly   Highly
temporary   persistent
problem   0 1 2 3 4 5 6 7   problem

Problem Recurrence. Has the problem recurred frequently or is it likely to recur frequently?

Extremely   High fre-
rare   quency of
problem   0 1 2 3 4 5 6 7   recurrence

Economic Value. Would solution of the problem save considerable time, money, or effort, or suggest a better allocation of economic resources?

No economic   High eco-
value   0 1 2 3 4 5 6 7   nomic value

Unconventionality. Is the problem novel, or is a novel approach to an old problem proposed? Is the problem an apparently appropriate one in spite of its novelty?

Highly   Highly
conventional   0 1 2 3 4 5 6 7   novel

A score of 56 points is possible on the scale. However, since each subject was assigned two scores (one by each rater) and these two scores were added, a total score of 112 points was possible.

RESULTS

An assessment of the proposed research problems yielded thirty-three scores, ranging from 16 to 101 points out of a possible total of 112 points. The mean was 58.3 and the median 53.2, indicating a positively skewed distribution. The standard deviation was 20.4. An analysis of information about the top seven scorers (High R Group) and the low seven scorers (Low R Group) yielded the following profiles.

Findings—High R Group

Personality Descriptions. Members of the High R Group were typically described in their evaluation forms as adaptable, inquisitive, intelligent, and adept at human relations. Persons writing evaluations gave lengthy, enthusiastic, and glowing recommendations about each member. The following comments, as separate examples, were recorded:

Personality which is broad in nature, flexible and adaptable to any situation. . . . Neither petty nor narrow, but has a wide range of interests . . . capable of handling difficult situations. . . . Has an inquiring mind and seeks to see the whole picture, the total job. . . . Quick at ascertaining the relative values of the job to be performed . . . a quiet, unassuming sensitive woman who possesses a wealth of knowledge in many fields. . . . Friendly, intelligent, and works well with people.

Well developed, well adjusted, emotionally mature and stable, responsible, adaptable, and resourceful . . . adept at dealing with the public. . . . Well educated, well read . . . witty and resourceful . . . a marvel in her wisdom and insight into human personalities.

Alert, industrious and quick to sort out problems and decide what action to take.

Exceptional person keenly aware of the needs of others. . . . Fine knowledge of the world . . . ambitious, reliable, and constantly seeking information.

Resourceful, energetic, and adaptable . . . high intellectual ability and emotional stability.

Adapts to new situations quickly . . . quick

to learn, intelligently inquisitive, bright, and pleasant in disposition.

Keen intelligence. . . . Most perceptive and inquiring mind.

Academic Background. The High R's had, for the most part, attended larger universities prior to enrolling at the University of Denver. Educational institutions represented by the High R's included Stanford, Chicago, Baylor, Colorado, and Cornell, Two small and relatively remote state colleges were also represented.

Areas of major academic concentration included international relations, sociology, English, economics, general humanities, history, and chemistry-physics.

GRE Scores. Mean scores for High R's on each test follow:

Verbal	621
Quantitative	555
Social Science	588
Humanities	640
Natural Science	561

All of these scores are higher than those of the Low R group, and score comparisons are made in the discussion section of this paper.

Age. The mean age of the High R's was 33.3 years while the median age was 31 years. The age range for the seven individuals extended from 22 to 47 years.

Findings—Low R Group

Personality Descriptions. The paucity of description included in the evaluation forms of the Low R group was the most conspicuous and amazing phenomenon encountered by the investigator. For the most part, the Low R's were almost nondescript, as personalities, to those writing recommendations. Recommendations were short and were apparently perfunctory and lacking in enthusiasm or spontaneity. The Low R's might be generally described as "colorless" personalities. The most laudatory comments in their records concerned their charac-

teristics of thoroughness and painstakingly methodical behavior. Excerpts follow:

Painstaking. . . . Hard and thorough worker of utter reliability . . . patient.

A very thorough planner . . . a bit too reserved.

Seldom creative but always thorough. . . . Lacks energy and enthusiasm. . . . Lacks interest . . . not outstanding.

Not outstanding . . . not a leader.

Academic Backgrounds. The Low R Group had attended, generally, smaller and less notable state colleges situated throughout the Midwestern states. The only major university represented was Colorado. Undergraduate academic majors included English (in five cases), education, and German.

GRE Scores. Mean scores for Low R's on each test follow:

Verbal	578
Quantitative	482
Social Science	498
Humanities	625
Natural Science	509

It is notable that these are not low scores, even though they are lower than those of the High R Group. The lowest percentile score (60) was for Social Science.

Age. The mean age of the Low R's was 26.5 years and the median age, 24 years. The age range extended from 22 to 45 years.

DISCUSSION

To summarize the results of the study, certain differences between the profiles of the Low R and High R Groups are notable:

1. Personality descriptions of High R Group members emphasized their flexibility, resourcefulness, inquisitiveness, and adeptness at human relations. Members of the Low R Group were generally described as methodical, painstaking, and thorough. Beyond this, there

was surprisingly little description of Low R's.

2. Most High R's had majored in problem and research-oriented disciplines, and most had attended larger, better-known universities. Most Low R's had majored in English and most had attended smaller or less selective and less well-known colleges.

3. The Graduate Record Examination scores for both groups were relatively high. However, High R's averaged 90 points higher on Social Sciences scores, 73 points higher on Quantitative scores, 52 points higher on Natural Science scores, 43 points higher on Verbal scores, and only 15 points higher on Humanities scores. High R percentile scores were for Social Sciences, 26 per cent higher; for Quantitative, 20 per cent higher; and for Natural Sciences, 14 per cent higher; for Verbal, 10 per cent higher; and for Humanities, 3 per cent higher.

4. Both the mean and median ages of the High R's were very close to seven years greater than mean and median ages of Low R's. A rank difference correlation of plus 0.545 existed between problem recognition scores and ages, to corroborate the mean and median age differences.

Because of a lack of adequate information about the general backgrounds and experience of members of both groups, few conclusions can be drawn about background factors which differentiated the two groups. It is noteworthy though that High R's generally possessed a more variegated background. Some had been provided with what might be called an "enriched" environment during their childhood. Others had experienced a variety of situations and environments following their adolescence. All had traveled widely within, or outside of, the United States.

Low R's shared such backgrounds in many respects, but apparently to a lesser extent. Two of them had traveled widely and had apparently been reared in "enriched" environments with highly educated parents. Other Low R's came from seemingly more restrictive environments. Without more specific information about the backgrounds of both groups, few conclusions could be drawn about the factors that contribute to problem-recognition ability.

The more concrete data from this limited study suggested that research and professional problem sensitivity are enhanced by education in problem-oriented curricula in institutions where there is a relatively greater emphasis on inquiry than on learning or memorization. Attitudinal contrasts between the two groups lend support to the idea that methodical, painstaking, or thorough approaches do not conduce to problem sensitivity. Differential GRE scores might suggest that problem sensitivity is engendered by experience and attitudes that promote the acquisition and use of social, quantitative, empirical, and verbal skills, in that approximate order of priority.

Age does seem to have some effect on the increased ability to recognize problems. Perhaps one acquires greater discriminatory ability as he gets older and sees more of the world and its contrasts. At any rate, there was a moderate degree of positive correlation (.545) between age and problem recognition in this investigation.

At the beginning of this paper it was pointed out that most definitions of the term "problem" presuppose an awareness of the existence of a problem; a problem's impact is felt. But apparently in research activity an existing and serious problem may not make itself felt. It may simply be there, in some stable, developing, declining, or cyclical form to be detected by a perceptive or problem-sensitive individual. His perceptive powers may, of course, be multiplied by some conceptual tool, such as mathematics, or a physical tool, such as an electron microscope. The mere posses-

sion of tools which enhance perceptive powers does not, however, assure their use for problem-finding. Nor can it be said that a problem-sensitive individual will automatically unearth many problems. Perceptive powers must be put to use to find problems, and this use implies that problem finders are somehow motivated to detect problems.

Findings of this study suggest that the problem-sensitive individuals were motivated to find problems. They had majored in problem-oriented and analytical disciplines. Their acquisition and retention of information was greater. Their higher Social Science, Quantitative, and Verbal scores, for example, possibly gave them the ability to see relationships between things, people, ideas and numbers. The acquisition and retention of this information and these abilities are perhaps motivated by a need to see discrepancy or disorder. Possibly problems possess aesthetic value for problem finders, or else they would not be tempted to focus on problems—the things many people consider to be cognitively ugly. ■■