

A STRUCTURED INTERVIEW FOR SELECTION OF GRADUATE STUDENTS

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In this article we will present a method for improving the traditional approach to selecting potential graduate students. The goal of the method is to apply more equitable strategies and reduce the chances of rejecting the “right” students. The method, known as the “structured interview,” is currently used by industrial/organization psychologists to select employees for many major corporations.^[1,2] Although some may question the notion that student selection is an educational issue, we feel strongly that a commitment to the fairest possible selection method models and teaches integrity to students.

New faculty members are often advised by their peers, mentors, and former supervisors to carefully select graduate students who are best suited to the member’s specific field and setting. In fact, it is often said that the choice of graduate students in the early stages of a career heavily influences one’s long-term success as well as that of the students in question. In some settings, selection is done at the departmental level. In such cases, the method described here can be easily adjusted to meet departmental selection needs.

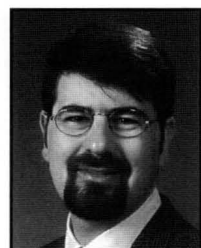
A number of professors were interviewed regarding the secret of their success in recruiting successful graduate students. Recommendations included using criteria such as good marks, high ambition, and good interpersonal skills—and even good luck was cited. Although the responses served to describe successful graduate students, they did not offer a systematic approach to differentiating between applicants. This is an especially difficult task considering the limited amount of time generally devoted to screening applications for graduate studies. Unfortunately, many professors confess that the selection of quality graduate students is basically a “crap shoot.”

One of the most widely used tools for selecting graduate students is the interview. It serves two purposes: to select graduate students and to sell the professor’s (or the

department’s) research program to the student. A traditional interview usually consists of an interviewer engaging in a “free-wheeling” conversation with the student. This is known by experts in the field of industrial/organizational psychology as an “unstructured” interview.^[3] The professor asks many different kinds of questions, some of which may be conjured up on the spot. It appears, however, that most interviewers tend to rely on a set of questions commonly used by their colleagues.

This traditional approach to conducting an interview often results in hiring the best interviewee rather than the best candidate. In fact, recent research findings indicate that this approach has only a 15 to 20% chance of predicting performance.^[4] This is particularly unfortunate because it is difficult and costly within the structure of most graduate programs to have unsuccessful students withdraw. Table 1 compares research findings concerning the ability of various selection tools to predict job performance.

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The interview procedure discussed here can be somewhat lengthy, but when one expects to work with the candidate for a period that can span two to six or more years, it makes sense to spend a reasonable amount of time on the selection process. . . .it appears worthwhile to invest energy in developing strategies for selection that incorporate the latest available expertise.

Because most questioners tend to ask the candidate to evaluate themselves (*e.g.*, “What are your weaknesses?”), a skillful interviewee can turn an interview into a pleasant, yet uninformative, session. The result is that an interviewee who is well-versed in interviews may well be considered for a position over a poor interviewee who has the potential to become an excellent graduate researcher.

Traditional unstructured interviews also suffer from the fact that they contain no systematic rating procedure. Typically, the interviewer makes a decision based on a “gut feeling” or a “hunch.” In fact, interviewers tend to make a decision about an applicant within the first four or five minutes of the interview.^[3] In other words, the first impression made by a prospective candidate turns out to be extremely important. This is troubling since the first few minutes of an interview are typically devoted to idle banter that serves to put the candidate at ease. Research has also identified the following characteristics of unstructured interviews:^[3]

- *Interview ratings are more influenced by unfavorable information than by favorable information.*
- *Interviewers recall information presented at the beginning and at the end of an interview better than information in the middle.*
- *Interview ratings are better if the applicant follows a poor candidate and worse if the applicant follows a good candidate.*
- *Interviewers see female applicants as more appropriate for certain positions (regardless of qualifications).*
- *Interviewers give better ratings to applicants with whom they have more in common.*

THE STRUCTURED INTERVIEW

One solution to the above problems is the “structured”

TABLE 1
Validity of Selection Tools for Recruitment of Personnel^[4]

Unstructured Interview	0.20
Reference Check	0.26
Assessment Centers	0.36
Unstructured Board Interview	0.37
Psychological Testing	0.53
Structured Interview	0.70

TABLE 2
Qualities Possessed by Successful Graduate Students

Academic Skills
Writing Skills
Dependability
Listening Skills
Ambition
Passion
Oral Communication Skills
Organization
Independence
Creative Ability
Persistence
Interpersonal Skills
Self-Esteem
Laboratory Skills
Computer Skills

interview. The use of a structured interview forces the interviewer to avoid straying from a predetermined question sheet and avoids the use of non job-related questions (such as marital status, age, child care, or religion) that can result in litigation.^[1] In fact, precedents have already been set in which structured interviews have protected interviewers from litigation.^[3] What many fail to realize is that interviews are viewed by the courts as tests, and as such they are subject to the same validation requirements.^[2]

A structured interview is characterized by four basic features: a series of questions relevant to the job, immediate scoring of the answers to the questions, scoring based on benchmark answers, and the calculation of a sum for an overall interview score.^[3] Comparisons can be made to a benchmark overall interview score or between competing candidates.

The development of the structured interview is straightforward and has been outlined by Wiesner.^[3] First, one must identify examples of effective, ineffective, and typical behaviors that contribute to the success or failure of graduate students. It is generally advisable to draw upon the experience and expertise of several qualified individuals to accomplish this task in order to justify the choice of behaviors.

In our case, extensive consultation with peers and senior colleagues was undertaken first. After establishing a list of qualities (see Table 2), a set of questions was generated to assess the degree to which each candidate possessed the qualities. The questions were designed to reflect typical work situations and to reveal the presence or absence of the quality in question. Benchmark answers and scores were then generated for each question, and the predetermined answers and scores were used to evaluate candidate responses. At the conclusion of the interview, the scores were tabulated. They can be compared either to competing candidates or to a previously established “cut-off” score.

Certain qualities, such as laboratory and computer skills, can be rather difficult to assess by means of a question-and-answer session. In these cases, a simple situational assessment^[2] is performed, *e.g.*, the candidate is asked to actually perform the skill being evaluated as part of the interview process.

Using recommendations from the literature,^[1-4] we have designed a structured interview for selecting candidates for graduate school in chemical engineering. The interview is based on the qualities associated with success in graduate school (as outlined in Table 2). Because widely distributed information concerning the specific questions and situational assessments used would obviously threaten the validity of the interview and undermine the goal of this work, they are not included in the present paper, but professors interested in obtaining a copy of the question sheet can contact the authors (e-mail address: dube@genie.uottawa.ca).

A TYPICAL INTERVIEW

A typical interview is presented here with omission of certain specific details in order to protect the validity and reliability of the interview.

Prior to the interview, an academic transcript is obtained from the candidate; it is scored based solely on third- and fourth-year marks since these are, in our opinion, generally more representative of current performance in chemical engineering than first- and second-year marks.

An *academic quality* score is obtained in the following manner: 1 for an average below 75%; 2 for an average from 75 to 79%; 3 for an average from 80 to 84%; 4 for an average from 85 to 89%; and 5 for an average of 90% or greater (the scale chosen here could also be based on grade-point averages or letter grades). We suggest incorporating the use of reference letters only if they are submitted by reliable sources. It is, however, *always* advisable to check references.

The candidate's writing skills can also be assessed via their letter requesting the interview. If the candidate comes from within the interviewing department, ask him/her to submit a formal written request for the interview. This letter can then be graded for grammar, structure, spelling, etc., and scored out of 5. (We consider it a plus if the student has enough foresight to have the letter proofread by someone.)

At the beginning, the interviewer should put the student at ease by doing most of the talking. This is an opportune time to tell the candidate about your own expectations and about

your research. When the "sales pitch" is completed, it is time to begin the structured interview. The student should be informed that he/she is now going to be evaluated in a consistent and equitable manner by being asked the same questions as any other candidate. (In our experience, this explanation satisfies students who are very accepting of

structured interviewing, most likely because they understand the importance of using a fair and empirically validated method of selection.) You may choose to allow the student to take notes.

The interview proceeds with the posing of questions and presentation of scenarios to which the candidate must respond. For instance, in order to assess **oral communication skills**, the candidate can be asked to tell the interviewer about his/her hobbies and interests. During this time, the interviewer should concentrate on the oral communication skills of the candidate rather than giving careful attention to the content of what is being said. The candidate can be given 1 point for each of the following criteria: eye contact, audibility, command of the language, grammar, and a logical progression of ideas.

The **creative ability** of the candidate can be evaluated by posing a technical problem that you are currently trying to solve. The candidate can be given 1 point for each reasonable idea, up to a maximum of 5.

The candidate's **interpersonal skills** can be assessed by proposing a scenario in which a conflict with a co-worker arises. Scores can be allotted based on how the candidate

proposes to resolve the conflict.

Some skills cannot be assessed simply by an applicant's verbal response to a simulated scenario. This is the case for the candidate's **laboratory skills** and **computer skills**. For example the candidate could be invited to perform simple laboratory-skills tests and then be observed for errors such as improper measurements, inefficient use of equipment, poor calculations, inability to follow instructions, haste, cleanliness, etc.

Clearly, no single characteristic can be perfectly assessed using a single structured interview question. But together, the questions comprising the structured interview serve to give a more valid indication of the candidate's future performance.

The total score should be calculated immediately after the student leaves. If so desired, the questions can be weighted differently, depending on their relative importance as per-

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ceived by the interviewer.

A professor can refine a structured interview to more accurately reflect the required skill set. Skills or qualities can be added and extra questions or hands-on tests can be incorporated into the interview as needed. Conversely, certain skills or qualities can be eliminated. In other words, the interview is based on a situational assessment of the *specific requirements for the job*. Not all supervisors (or departments) are created equal. Some may want a very independent, ambitious, and creative student, while others may want what amounts to a technically skilled, obedient, and dependable laboratory technician.

One challenging situation involves the implementation of a structured interview in the case of international students. A long-distance phone interview, or video conferencing, or similar technologies may provide a partial solution. It may also be possible to have an on-site trusted colleague perform all or part of the interview.

The interview procedure discussed here can be somewhat lengthy, but when one expects to work with the candidate for a period that can span two to six or more years, it makes sense to spend a reasonable amount of time on the selection process. This is particularly important given the time and effort required to supervise graduate students and the significant contributions that talented students can make. Thus, it appears worthwhile to invest energy in developing strategies for selection that incorporate the latest available expertise. This structured interview is currently being implemented and data are being collected regarding its success in predicting performance.

As mentors, it is important to model fairness and integrity. Use of a structured interview can convey these values and demonstrate to students that their evaluation is based on competencies and not on irrelevant personal traits.

ACKNOWLEDGMENTS

Many thanks to Professor Willi Wiesner of McMaster University and Dr. David Lynn for their helpful discussions. Many colleagues were involved in the initial discussions regarding the qualities possessed by top graduate students, and for this they are gratefully acknowledged.

REFERENCES

1. Daniel, C., and S. Valencia, "Structured Interviewing Simplified," *Public Personnel Management*, **20**(2), 127 (1991)
2. Pursell, E.D., M.A. Campion, and S.R. Gaylord, "Structured Interviewing: Avoiding Selection Problems," *Personnel J.*, 907, Nov. (1980)
3. Wiesner, W.H., "Chapter 9: Interviewing," in *Recruitment and Selection in Canada*, V.M. Catano, S.F. Cronshaw, W.H. Wiesner, R.D. Hackett, and L.L. Methot, eds., ITP Nelson, Toronto, Ontario (1997)
4. Van Clieaf, M.A., "In Search of Competence: Structured Behavior Interviews," *Business Horizons*, March-April, 51 (1991) □

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