A Prediction Model of Performance in Level II Fieldwork in Physical Disabilities

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Objectives. A prediction model of performance in physical disabilities fieldwork was generated with grades received in the occupational therapy curriculum and in prerequisite courses.

Method. Grades included those from functional anatomy, neuroanatomy, physical disabilities lecture, physical disabilities clinic, and prerequisite anatomy and physiology courses. Sampling was done collectively over graduated occupational therapy classes from 1987 to 1992 at the University of Puget Sound. A multiple regression analysis was performed and prediction equations were generated for each subscale of the Fieldwork Evaluation for the Occupational Therapist. Equations for combinations of the subscale categories were also produced.

Results. Adjusted $R^2$ values were found to be less than 10% in all equations.

Conclusion. This poor ability of grades to predict fieldwork performance suggests that future investigation be focused on variables other than grades. Such variables might include student motivation, rapport between the student and fieldwork supervisor, and hospital experience in physical disabilities.

Succesful performance of occupational therapy students in professional practice is the goal of every occupational therapy educational program. Upon completion of coursework in occupational therapy, each student enters into a 6-month internship called Level II fieldwork. Although studies are largely lacking, performance in Level II fieldwork has apparent validity as an indicator of success in educational therapy practice (Cooper et al., 1986). Therefore, quality improvement in education dictates identification of those factors that best predict performance in Level II fieldwork. Schools could use such information to allocate more time to those academic subjects that are the strongest predictors of performance during fieldwork. Other subjects or portions of subjects could be reevaluated as to their usefulness to current occupational therapy practice. In addition, knowing what strengths are most valuable for a successful fieldwork experience could be useful for developing a screening tool for applicants to occupational therapy education programs. Counseling for students already enrolled in education programs could be facilitated by knowing what clinical strengths are most necessary.

Background of Student Performance Evaluations

Before 1974, the student's supervisor evaluated student performance with the Report of Performance on Student Affiliations (RPSA) (Crocker, Muthard, Slaymaker, & Sampson, 1975). The RPSA was never tested for validity and reliability. To remediate this shortcoming, the American Occupational Therapy Association (AOTA) devised the Fieldwork Performance Rating (FWPR), which was developed for use beginning in 1974-1975 (Slaymaker, Crocker, & Muthard, 1974). To enhance the accuracy of evaluation, the FWPR was revised in 1986 and renamed The Fieldwork Evaluation for the Occupational Therapist (Cooper et al., 1986).

Over the years, six studies have examined correlates and predictors of Level II fieldwork performance. The first study (Englehart, 1957) sampled 101 baccalaureate occupational therapy students at San Jose State College from 1945 to 1951 to examine the predicted values of grades on Level II fieldwork. Variables studied were grades on the RPSA and college course grades in biological sciences, medical information, social recreation, sociology, occupational crafts, and occupational therapy theory. Categories for fieldwork were pediatrics, physical disabilities, psychiatry, and general medicine; hence four fieldwork grades were generated per student. The results of the study showed significant correlations for only a few of the variables: .33 between the occupational therapy crafts course and the orthopedics internship ($p < .01$), .28 between occupational therapy crafts and the pediatrics internship ($p < .01$), and .27 between the biological science course and psychiatry ($p < .01$). However, Englehart concluded that these values indicated poor percent predictability for
the variables measured. No other candidates for predictive variables were identified.

Anderson and Jamme (1965) studied the relationship of both selected course grades and a standardized aptitude test, the Florida Placement Examination (FPE), with scores from the RPSA parts I and II. Their subjects were 28 baccalaureate students in occupational therapy at the University of Florida from 1961 to 1964. The courses chosen included physical sciences, English, logic, mathematics, humanities, biology, psychology, and American institutions. In addition, the FPE has four sections—English, natural science, social science, and mathematics. A college aptitude test that was similar to an IQ test was also included. Their findings showed that none of these variables significantly correlated with the RPSA. They concluded that grades and achievement measures such as a standardized aptitude test appeared ineffective as predictors of Level II fieldwork performance. The weakness of the study as discussed by the authors was a small sample size. The authors also suggested that numerical scores be used in lieu of letter grades to increase the variability of scores.

Lind's (1970) study of 75 subjects (50 baccalaureate students and 25 graduates) at the University of North Dakota in 1961 and 1962 correlated grades and scores on the RPSA in four areas: general medicine, psychiatry, pediatrics, and physical disabilities. The variables correlated were grade point average (GPA) in overall studies, GPA at the beginning of the junior year, and average GPA in humanities courses, biological sciences, medical sciences, and professional courses in occupational therapy. The specific courses included in the latter two categories were not mentioned.

Lind (1970) used multiple regression equations to identify those variables that best predicted RPSA ratings. Among the significant variables were total GPA, GPA at the junior year, GPA in medical science courses, and standardized interest test results. Although significance was attained, Lind concluded that the predictive value of grades and interest scores was poor. A major weakness of the study was the low interrater reliability on the RPSA. Other weaknesses were the lack of definition and standardization in clinical performance. The finding that grades surpassed interest test outcomes in predictive value was noteworthy.

In her study of grades as predictors of Level II fieldwork performance, Ford (1979) examined the 1975 class of baccalaureate occupational therapy students at Colorado State University (N = 72). The sample included 47 nontransfer students and 25 transfer students. Grades from 16 courses and overall GPA were compared with scores on the FWPR. A chi-square statistic was run between each course and the FWPR scores. Neurology grades were found to be significantly different from Level II fieldwork grades. Expected grade values used in these analyses are not clear from the study.) Ford also analyzed the data with a Pearson product-moment correlation followed by a multiple regression statistic. Results revealed no significant correlation between internship scores and grades for the general sample of students. However, when the nontransfer group was deleted from the sample and the data were reanalyzed, anatomy course grades were significantly correlated with the FWPR. The percent predictability of anatomy grades was low, however (r^2 = .16). Furthermore, Ford concluded that the sample size for the latter regression equation was too small (N = 25) to yield valid results. Ford suggested focusing on independent variables other than grades, especially the personality and interests of the student and supervisor.

The first study on fieldwork performance prediction of entry-level master's degree students was conducted by Katz and Mosey (1980). The purpose of their study was to investigate relationships between academic performance in didactic and clinical courses and Level II fieldwork. The subjects were 45 occupational therapy students at New York University between 1974 and 1979. Variables for a correlation study included the physical disabilities and the psychosocial dysfunction, undergraduate GPA, occupational therapy course GPA, those occupational therapy grades relating more to physical disabilities courses, and those occupational therapy grades having more to do with psychosocial dysfunction. Level II fieldwork scores in physical disabilities were significantly correlated with occupational therapy course work GPA (r = .39), occupational therapy grades relating more to physical disabilities courses (r = .41), and occupational therapy grades relating more to psychosocial dysfunction (r = .41); however, the relationships were weak.

Katz and Mosey then ran correlations with specific course grades and Level II fieldwork grades as variables. Significant correlations ranging between .32 and .43 were found between six courses and the Level II fieldwork scores for physical disabilities. Thus, as in Lind's study, the strength of the relationships was poor. A difference between this study and Ford's study was that neurology was not found to be significantly correlated with the FWPR. Katz and Mosey also expressed dissatisfaction with the FWPR as an evaluative tool due to its high mean scores and low variability. This was the explanation offered to account for low predictability.

Most recently, Mann and Banasiak (1985) reported an 8-year retrospective study examining the same relationships as Katz and Mosey; however, the population studied, students of occupational therapy at the State University of New York at Buffalo, was much larger (N = 328). Variables were similar to those used in Katz and Mosey's first correlational study with the addition of grades from several specific courses. Pearson product-moment correlations were used to analyze the data. Significant correlation was found between the Level II fieldwork in physical disabilities and some of the variables. However, the strongest correlation was with overall GPA.

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and was only .20.

The assumption in choosing such a large sample size was that it would be easier to find relationships between academic grades and fieldwork grades. The authors were therefore surprised to find that the correlation coefficients were so low ($r = .01 - .21$). The results of this study, in their opinion, obviated the need for further correlation studies using grades and Level II fieldwork scores. The weakness of the correlations discovered were explained by the small variance and high means for grades in their data. Almost all of the students had As and Bs. The authors called for new approaches to find new factors that have a stronger relationship to Level II fieldwork outcomes. One suggestion was to study those students who performed well in course work but did poorly in Level II fieldwork or students in the converse situation.

In summary, the studies cited in this review revealed either no significant or weak significant correlations between occupational therapy students' grades and fieldwork performance. Similar results were obtained from those studies that ran multiple regression statistics. The fact that none of these studies used a grade from a clinical course as a variable is important. At the University of Puget Sound (UPS), an on-site occupational therapy physical disabilities clinic is conducted for students in their final term of didactic courses. Ascertaining whether the grade from this course has predictive value for Level II fieldwork in physical disabilities would be important. If there were a moderate to strong correlation, for example, emphasis could be placed on clinical experience during or before the program. If the correlation is a weak one, the course might be patterned more closely after Level II fieldwork. The purpose of this study was to select the best predictors for performance in Level II fieldwork in physical disabilities from the didactic and clinical courses at UPS. The apparent similarities between a physical disabilities clinic course and the physical disabilities fieldwork would be expected to have a significant influence on fieldwork evaluations.

**Method**

A retrospective record review of grades in specific subjects was used to develop a prediction model of Level II fieldwork. The grades included those from functional anatomy, neuroanatomy, physical disabilities lecture, physical disabilities clinic, and prerequisite anatomy and physiology courses. The student population was systematically sampled to include graduated occupational therapy classes from 1987 to 1992 at UPS. Baccalaureate, second baccalaureate, and entry-level master's degree students were included among the 257 subjects.

Permission to access records was given by the occupational therapy department. All grading other than the clinic grade ranged from 0.0 to 4.0. A percentile scale (0-100) was used for scoring the clinic grade. Grades from the courses identified above were obtained from the registrar and matched to corresponding scores on Level II fieldwork in physical disabilities. The entire matching process was performed by the registrar in a way that protected the anonymity of the students. Because there was little change in course instructors and course syllabi did not change greatly in any of the UPS courses taught from 1987 to 1992, grading was not deemed to be a source of unreliability.

The Fieldwork Evaluation for the Occupational Therapist (Fieldwork Evaluation) (Cooper et al., 1986) was the instrument used to score Level II fieldwork. This is the first prediction study to use the Fieldwork Evaluation. Cronbach's alpha coefficients for internal consistency of the Fieldwork Evaluation ranged from .92 to .96 for each component score—judgment, performance, and attitude (Cooper et al., 1986). Validity studies on the Fieldwork Evaluation showed that scores in each of the three main categories correspond to Fieldwork Evaluation scores and recommendations for entry-level occupational therapy practice (Cooper et al., 1986).

**Data Analysis**

Both yearly and overall means and standard deviations were calculated for each of the dependent and independent variables. This was followed by a Pearson product-moment correlation that produced a correlation matrix comparing all variables. From this table the significance of the correlations was assessed. In addition, the percentage of predictability explained by one variable toward another was determined. A stepwise multiple regression analysis was then performed in which the previously stated grades were independent variables. Additional programs were run to test for assumptions of colinearity, normality, and homogeneity of variances. The assumption of independence of independent variables was assured by checking the values of the correlation coefficients between them. The dependent variables included the three component Fieldwork Evaluation scores (judgment, performance, and attitude) and two newly created variables: the sum of the judgment and performance scores (achievement total), and the sum of all three scores (combined total). Multiple regression equations were generated for each dependent variable. Independent variables were added and deleted to determine the model that best predicted each dependent variable.

**Results**

Overall means of each independent variable were within 7% of each of the means from individual classes (years) (see Table 1); hence the variables were even from class to class. The only exception was scores for the clinic course for the class of 1989. Nine points were added to each 1989 clinic grade so that the class average equaled the overall
average on this variable. Because other class grades for 1989 were high and instructors for the clinic were different in 1989, this was judged to be a fairer reflection of ability.

The correlation matrix among courses is filled with significant correlations ($p < .05$). Correlation coefficients are very high among dependent variables ($r > .87$). In contrast, correlation coefficients between dependent and independent variables are low ($r < .22$). Likewise, coefficients are relatively low between independent variables with the exception of that between functional anatomy and neurology courses. Both of these courses were taught by the same instructor.

Discussion

The high correlations between dependent variables reveal that students with good attitudes tended to score well on performance and judgment. Similarly, those with unsatisfactory attitudes tended to score low on the other subscales. Student attitudes might be assumed to be a function, in part, of the student-supervisor relationship. Indeed, the high correlation between attitude and performance implies that the quality of the student-supervisor relationship is critical.

The correlations were run as a preliminary step to the regression analysis. This step guarantees that the independent variables are not strongly intercorrelated—an assumption of the regression statistic. The regression equations (see Appendix) are the prediction model for fieldwork performance. All equations are functions of only the physical disabilities and the clinic scores. This information, taken alone, would imply that the other three grades do not carry as much weight in predicting fieldwork performance. However, the models predict less than 10% of the variation of the dependent variables. Hence, one would be mistaken to overinterpret the predictive value of the model. One can only speculate about the other factors that might predict more than 90% of the variation. Factors having a negative influence may include family problems, attitude problems on the part of the student, and problems of rapport between therapist and supervisor. Positive factors could include a high degree of student motivation, wise counseling and coaching from teachers and supervisors, and strong social support systems. Quantity and quality of time spent before internships in observation of occupational therapy could also be an advantage. Such factors may compensate for other apparent weaknesses and limitations.

Previous studies have shown little support for using grades as independent variables in building a prediction model. A percent prediction of 10% is of little use. The prediction model found by Lind (1970), in which interest test results and grades were taken into account, was stronger than the one obtained in the present study, although its predictive power was still weak. Inclusion of the clinic course in this study did figure into the regression equations. We hypothesized that inclusion of the on-site clinic grade would result in a greater adjusted $R^2$ than was observed. One explanation for this failure to significantly increase the adjusted $R^2$ might be the small variance ($SD = 6$; range: 0–100%) of the clinic grades. With the scores so heavily clustered about the mean, statistical significance is less likely. Another explanation may be that the design of the clinic course failed to imitate the physical disabilities fieldwork closely enough to have a powerful bearing on performance. Students in the clinic course saw one client once a week for 10 weeks. A hospital environment in which a student occupational therapist treats more than 8 patients per day would be quite different.

Besides the clinic grade, the physical disabilities and functional anatomy scores entered into the regression equations. When the prerequisite anatomy and physiology grade was eliminated from the set of regression variables, greater values of the adjusted $R^2$ resulted. This grade did not correlate with any of the Fieldwork Evaluation subscales. Therefore, it is not surprising that it did not figure into the regression equations (except attitude). It did correlate significantly with other course work, but not significantly enough to make a difference in the prediction models.

Even a strong prediction model has inherent limitations due to the nature of the statistic used. In multiple regression analysis, the equations predict most accurately those subjects whose grades are close to the overall mean grades. Those scores on the dependent variables that fall at the high and low ends of the ranges in the data may not be predicted well by these models. For example, if maximal scores of 400 for physical disabilities and 100 for clinic are put into the equation for the combined fieldwork total

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**Table 1**

Means and Standard Deviations for Grades and Physical Disabilities Fieldwork Scores for Graduated Occupational Therapy Students ($N=257$)

<table>
<thead>
<tr>
<th>Variables</th>
<th>$M$</th>
<th>$SD$</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Independent</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anatomy and physiology</td>
<td>3.09</td>
<td>0.64</td>
<td>0–4.0</td>
</tr>
<tr>
<td>Functional anatomy</td>
<td>3.07</td>
<td>0.56</td>
<td>0–4.0</td>
</tr>
<tr>
<td>Neuroanatomy</td>
<td>2.94</td>
<td>0.62</td>
<td>0–4.0</td>
</tr>
<tr>
<td>Physical disabilities lecture</td>
<td>3.18</td>
<td>0.55</td>
<td>0–4.0</td>
</tr>
<tr>
<td>Physical disabilities clinic $^a$</td>
<td>0.91</td>
<td>0.06</td>
<td>0–100</td>
</tr>
<tr>
<td>Dependent</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Performance (P)</td>
<td>189</td>
<td>27</td>
<td>125–230</td>
</tr>
<tr>
<td>Judgment (J)</td>
<td>202</td>
<td>28</td>
<td>132–240</td>
</tr>
<tr>
<td>Attitude (A)</td>
<td>226</td>
<td>31</td>
<td>146–255</td>
</tr>
<tr>
<td>Achievement total (P+J)</td>
<td>391</td>
<td>55</td>
<td>257–470</td>
</tr>
<tr>
<td>Combined total (P+J+A)</td>
<td>616</td>
<td>83</td>
<td>393–725</td>
</tr>
</tbody>
</table>

*Note: In the case of the class of 1989, scores ranged from 9 to 109; however, no student scored greater than 100 from that class even after the correction increment of 9 points. $^a$Clinic final scores were reported as a percentage.
score (see Appendix), the highest possible score predicted is 664 out of 725. However, many students scored close to 725. Those students who scored maximally on the combined score and on the two grades that figure into the equation for that score would still be within one standard error (SE) of 664 (SE = 80.45). (The SE represents one standard deviation of the errors predicted on a given score of the dependent variable.) However, for students who scored below average in clinic, earned an A in physical disabilities, and also scored within 5 to 10 points of 725 on the combined score, the model would not be a good predictor. In this case the student would have scored more than one SE from what was predicted. Similar limitations of the prediction model can be shown to be present at the lower range of the dependent variable. The problem with using the model as a prognosticator is that prediction is not accurate at the point at which a minimal passing score is obtained. Hence, students with a questionable grade performance are no closer to knowing whether they will pass Level II Fieldwork.

Recommendations for further study include a closer examination of those students with failing grades or poor combined total scores on the three complement Fieldwork Evaluation scores. A prediction model could be made for just this subset of the sample. This would compensate for the limitations of the multiple regression statistic just described. The grading scale in the clinic course could also be divided into subsections of judgment, performance, and attitude. Likewise, student evaluation forms for Level I fieldwork could be formatted into categories that can easily be compared with the Level II Fieldwork Evaluation. The dynamics of the student-supervisor relationship could also be included in a model. This new model would include a student learning style variable and personality variables for both student and preceptor. Student evaluations of fieldwork sites could give valuable information about the pace or workload. If students felt overwhelmed, for example, this would likely have a negative effect on attitude. Assessing a student’s motivation would also be useful. Once a prediction model is refined, a new standardized test could be designed to be used to screen applicants to occupational therapy programs. Questions on the screening tool could be based on the most salient predictors. Such a tool would most likely include both written and practical items. A format using an interactive video might be appropriate.

Finally, a recommendation for future study would be to limit the sample to those facilities most frequented for fieldwork. A limitation of any study using the Fieldwork Evaluation is the question of interrater reliability. The diversity in fieldwork sites and in supervisor expectations allows for a substantial degree of error on the Fieldwork Evaluation. By using only a limited number of sites, the pool of supervisors would be restricted and the resulting Fieldwork Evaluation scores would likely be more reliable.

Summary
At least six correlational studies have been conducted between occupational therapy grading and Level II fieldwork since 1957. Either no correlations or significant but weak correlations were found. What differentiated this study from previous studies was the explicit presence of a physical disabilities clinic course. Although the clinic course correlated significantly with both the performance and judgment subscales of the Fieldwork Evaluation, the correlations were again weak ($r = .11$ and $r = .13$ respectively). The regression equations were also weak, explaining less than 10% of the variability. These results suggest that future investigations be focused on variables other than grades. Such variables might include student motivation, student learning styles, rapport with the fieldwork supervisor, hospital experience in physical disabilities, basic judgment ability, and social support.

Appendix
Prediction Equations for Scores From Fieldwork Evaluation for the Occupational Therapist

Performance = 11 (physical disabilities) + 92 (clinic) + 70.82

Judgment = 9 (physical disabilities) + 84 (clinic) + 5 (functional anatomy)

Attitude = 7 (physical disabilities) + 81 (clinic) + 6 (functional anatomy)

Achievement total = 17 (physical disabilities) + 183 (clinic) + 8 (functional anatomy)

Combined total = 36 (physical disabilities) + 272 (clinic) + 273.33

References


academic grades, and pre-selection criteria of occupational therapy students. American Journal of Occupational Therapy, 34, 794-800.

