The Occupational Therapy Level II Fieldwork Experience: Estimation of the Fiscal Benefit

Harold Shalik, Linda D. Shalik

Key Words: costs and cost analysis • education, occupational therapy • services, occupational therapy

A nationwide study, from which the data in this article were taken, suggests that most physical dysfunction and psychosocial Level II fieldwork placements for occupational therapy students represent a financial benefit to the sponsoring institution. This article provides the occupational therapy educator or fieldwork site supervisor with a method for estimating the amount of financial benefit one may anticipate from the assignment of a student to a physical dysfunction or psychosocial Level II fieldwork placement. Time-consuming data collection and interpretation are not necessary to perform this analysis. A formula to predict the fiscal outcome is described. Step-by-step instructions guide the user in applying the formula to a given physical dysfunction or psychosocial Level II fieldwork situation.

Review of the Literature

Time logs have consistently been used to determine how students' time was spent in the fieldwork experience (Arthurson, Mander-Jones, & Rocca, 1976; Gildanders & Heiman, 1971; Payson, Gaenslen, & Stargardter, 1961). Freymann and Springer (1973), by computing direct and indirect expenditures in fieldwork education for medicine, nursing, and allied health, concluded that students provided manpower at a level that exceeded the costs of their education programs. Partially through the use of faculty logs, Paulson, Watkins, and Donaldson (1980) found that faculty salaries constituted the primary expense to an institution for fieldwork education, with costs of space and overhead found to be marginal. Chung, Spellbring, and Boissoneau (1980) conducted a cost-benefit analysis of occupational therapy fieldwork involving Eastern Michigan University students and found that the major fiscal cost to the institution resulted from the reduction in the production of agency services, or the use of personnel time in the training of the student. The institution received financial benefits in the revenue produced by students treating patients and in inexpensive labor by students for miscellaneous duties. Shalik (1986) followed up on the methodology and design of the Eastern Michigan University study using 180 supervisor/student responses for a cost-benefit analysis study and concluded that...
there was an average benefit to the agency of $4700 per student for a 12-week placement.

The Data Base

The data base used to predict fiscal cost or benefit for a Level II fieldwork placement was generated from Shalik's survey, which was completed during 1985 (Shalik, 1986). Table 1 shows that there were 156 occupational therapy fieldwork sites involved in the data collected. The sites were located in 32 states. Twelve occupational therapy professional schools located in different areas of the United States cooperated in the study, with 180 students from these schools supplying the log sheets for the data (in conjunction with paired log sheets from their fieldwork supervisors). A detailed discussion of the methodology used to collect these data appears elsewhere (Shalik, 1986).

Data Analysis

Net Present Value (NPV) represents the difference between benefit and cost, with allowance made for the discount rate over the period of the project. Because a fieldwork experience never exceeds 1 year, the discount rate is not a factor in the NPV for this particular fieldwork experience analysis (Sassone & Schaffer, 1978). If one subtracts the cost of a fieldwork experience (supervisor's input) from its benefit (student's input), the result is the NPV. Thus, NPV equals benefit minus cost. If the NPV is positive, the result is a fiscal benefit; if it is negative, the result is a fiscal cost. Thus the single outcome of NPV expresses either cost or benefit, based on the difference between these two variables.

Using the single-outcome variable NPV, we performed a stepwise regression, using covariates to predict the NPV outcome. The covariates deemed best suited for the prediction were (a) the types of fieldwork, (b) the week of the fieldwork, and (c) the fieldwork sequence (i.e., first, second, or third fieldwork experience) A curvilinear relationship existed between week and NPV; that is, the NPV increases with time, reaches a maximum point, and then starts a gradual decline beyond that point as time progresses. To account for this relationship a quadratic variable for the week (e.g., Week²) was added to the prediction equation.

Results

The original equation for the prediction of NPV, for any specified week, was as follows:

\[ \text{NPV}(W) = -824.65 + 294.45 \times \text{Week} - 15.57 \times (\text{Week}^2) + 166.97 \times \text{Fieldwork Sequence} - 537.33 \times \text{PedsFW} \]

The multiple R for this equation was .562, which accounted for about 31.6% of the variance in the NPV criterion variable.

Table 2 shows the percent of variance each predictor variable contributes to the NPV. Table 3 shows the distribution of the sequence of the fieldwork experience (i.e., first, second, or third experience). The third experience has only three paired responses. Table 4 shows the type of fieldwork experiences: pediatric fieldwork experiences have eight paired responses, and geriatric fieldwork experiences have four.
Table 3
Total Number of Fieldwork Experiences by Sequence (N = 176)

<table>
<thead>
<tr>
<th>Fieldwork Experience Number</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>116</td>
</tr>
<tr>
<td>2</td>
<td>57</td>
</tr>
<tr>
<td>3</td>
<td>3</td>
</tr>
</tbody>
</table>

**How to Use the Prediction Equation**

The prediction equation for a complete affiliation is as follows:

\[ \text{NPV TOTAL} = \text{NPV}(1) + \text{NPV}(2) + \text{NPV}(3) + \cdots + \text{NPV}(X), \]

where

- \( X \) = total weeks of affiliation (e.g., 6, 12, or 13 weeks)
- \( n \) = 1, 2, 3, \ldots, to \( X \) (\( n \) is the subset designation for each NPV. It is read “NPV for Week 1, or Week 2, etc.” \( n \) and “week” are always the same number.)
- Week = 1, 2, 3, \ldots, or \( X \)
- Week\(^2\) = (Week) \times (Week)
- Fieldwork Sequence = 1 or 2 (designate 3 or more as 2)

**Example.** To understand how to use the prediction equation, consider the following case:

- Type of Fieldwork: Psychosocial or Physical Dysfunction
- Length of Fieldwork Experience: 4 weeks
- Fieldwork Sequence: Second Fieldwork Experience

Therefore:

- \( X = 4 \)
- \( n = 1, 2, 3, \text{and } 4 \)
- Week = 1, 2, 3, \text{and } 4

Fieldwork Sequence = 2

NPV TOTAL = \text{NPV}(1) + \text{NPV}(2) + \text{NPV}(3) + \text{NPV}(4)

The formula for predicting a single week is

\[ \text{NPV}(n) = -824.65 + 294.45 \times (\text{Week}) - 15.55 \times (\text{Week}^2) + 166.97 \times (\text{Fieldwork Sequence}) \]

Substitute for \( n \), (Week), (Week\(^2\)), (Fieldwork Sequence):

\[
\begin{align*}
\text{NPV}(1) &= -824.65 + 294.45 \times (1) - 15.55 \\
&\quad \times (1 \times 1) + 166.97 \times (2) = -212 \\
\text{NPV}(2) &= -824.65 + 294.45 \times (2) - 15.55 \\
&\quad \times (2 \times 2) + 166.97 \times (2) = 36 \\
\end{align*}
\]

\[
\begin{align*}
\text{NPV}(3) &= -824.65 + 294.45 \times (3) - 15.55 \\
&\quad \times (3 \times 3) + 166.97 \times (2) = 253 \\
\text{NPV}(4) &= -824.65 + 294.45 \times (4) - 15.55 \\
&\quad \times (4 \times 4) + 166.97 \times (2) = 438 \\
\text{NPV TOTAL} &= (-212) + 36 + (253) + (438) = 515 \\
\end{align*}
\]

**Interpretation of the Example.** Given the example of a psychosocial or physical dysfunction fieldwork placement, which is the student's second fieldwork placement, with a duration of 4 weeks, there is a net benefit to the sponsoring institution of approximately $515.00 per student. This example demonstrates that it costs the institution $212 for the student's first week of fieldwork, a net cost of $212. There is a $36 benefit the second week, but this is still a net cost of $176 for the 2-week period. However, by the third week the benefit increases to $253 for Week 3, resulting in a net benefit for the 3-week period of $77. Thus, it is not until the third week that there is an overall benefit to the institution. It is obvious that the longer the fieldwork experience, the greater the net benefit to the institution for Week 3 and beyond.

**Limitations**

Table 3 shows that the third fieldwork sequence experience is based on only three student/supervisor pairs. The reader should not rely on a separate projection for the third fieldwork experience because of the small number of observations, but should treat the second and third fieldwork experiences exactly the same.

Table 4 shows that the original prediction equation was based in part on eight pediatric student/supervisor pairs. The analysis shows that this group of eight observations is significantly different from the psychosocial and physical dysfunction groups. The prediction formula used in this article is not recommended for a pediatric affiliation because of the small number of pediatric observations. More data will be required to predict the cost or benefit for a pediatric affiliation.

The prediction equation developed here has the probability of being accurate in 95 out of every 100
fieldwork experiences (or, stated in another way, inaccurate in 5 out of every 100 experiences). Thus, it may be used either for estimating the benefit one may anticipate in any given physical dysfunction or psychosocial fieldwork experience, or it may be used to confirm data that are created for any given fieldwork experience by means of a specific cost–benefit analysis for that case. The user is cautioned not to place sole reliance on this prediction equation in institutional negotiations without having other substantiating data.

Cross-Validation
The prediction equation developed in this article is based on a single sample from the total population. It is reasonable to assume that each time such a sample is taken a somewhat different equation will be developed. To determine the proposed equation's ability to give a good estimate of the NPV TOTAL when applied to a new and similar group, a cross-validation technique was used.

Huck, Cormier, and Bounds (1974) advocated the following:

The technique of cross-validation involves four simple steps:
1. The original group of people (for whom both predictor and criterion scores are available) is randomly divided into two subgroups.
2. Just one of the subgroups is used to develop the prediction equation.
3. This equation is used to predict a criterion score for each person in the second subgroup (i.e., the subgroup that was not used to develop the prediction equation).
4. The predicted criterion scores for people in the second subgroup are correlated with their actual criterion scores. A high correlation (that is, significantly different from zero) means that the prediction equation works for people other than those who were used to develop the equation. If the individuals in future studies are not too much different from those in the cross-validation procedure, the researcher is justified in using the prediction equation for groups other than the original. (pp. 159–160)

Using this technique, the prediction equation for any given week was as follows:

$$\text{NPV}_1 = -713.3 + 294.1 \times (\text{Week}) - 15.65 \times (\text{Week}^2).$$

With the new prediction equation, a criterion score for NPV1 was created for the second subgroup, n = 90. Using SAS PROC CORR (SAS terminology for Procedure Correlation, SAS, 1985), variables NPV (from original data set) and NPV1 (predicted NPV from NPV1 equation), a 2 × 2 correlation matrix was developed. A correlation between NPV and NPV1 of 0.49843 was found, which was significant at the .0001 level. It can be concluded that the prediction equation can be used for groups other than the original.

The Prediction Formula
A prediction formula has been developed for educators and fieldwork site supervisors to estimate the fiscal benefit for a Level II fieldwork experience for psychosocial or physical dysfunction settings. The prediction equation takes the form:

$$\text{NPV} = -824.65 + 294.45 \times \text{(Week)} - 15.55 \times \text{(Week}^2) + 166.97 \times \text{(Fieldwork Sequence)}.$$

If the NPV is positive, it represents a benefit; if it is negative, it represents a cost. The above prediction formula is for any given week from 1 to 13. Therefore, in a 12-week fieldwork experience, the NPVs for Weeks 1 through 12 are summed, with the total representing the cost or benefit for the total fieldwork experience. Table 5, developed from the above prediction formula, shows that students in their first experience represent (after a 12-week fieldwork experience) a $4967 benefit and that students in their second or third experience represent a $6971 benefit. A cross-validation study used to correlate the known NPV with the predicted NPV proved significant at the .0001 level and suggested that the prediction equation created in this article can be used for similar groups other than the original. The data for the physical dysfunction (n = 77) and psychosocial experiences (n = 91) are sufficiently large to justify generalization to the total population.

Discussion and Conclusion
The ability to predict a cost or benefit for a Level II fieldwork experience offers the occupational therapy educator, the fieldwork site supervisor, and the administrator the opportunity to control the cost of a Level II fieldwork placement. Short affiliations, which are subject to high start-up costs in the early weeks and a downturn of fiscal benefits in the final weeks, should be discouraged if financial cost is a factor to the department or institution. The longer the affiliation, up to 13 weeks, the more fiscal benefits the sponsoring organization may expect to realize.

Educators, when organizing their placement

Table 5
Net Present Value by Week Number and Fieldwork Sequence Number for Physical Dysfunction or Psychosocial Fieldwork Placement

<table>
<thead>
<tr>
<th>Fieldwork Sequence</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
<th>12</th>
<th>13</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>-379</td>
<td>-510</td>
<td>-424</td>
<td>-153</td>
<td>273</td>
<td>822</td>
<td>1464</td>
<td>2167</td>
<td>2899</td>
<td>3651</td>
<td>4331</td>
<td>4967</td>
<td>5510</td>
</tr>
<tr>
<td>2</td>
<td>-212</td>
<td>-716</td>
<td>77</td>
<td>515</td>
<td>1108</td>
<td>1824</td>
<td>2633</td>
<td>3502</td>
<td>4402</td>
<td>5301</td>
<td>6168</td>
<td>6971</td>
<td>7680</td>
</tr>
</tbody>
</table>

Suggest using Fieldwork Sequence 2
schedules, may take into consideration that students in their second or third affiliation bring more fiscal benefits to a placement than do students in their first fieldwork experience. Rotation among students in their first and those in their second or third experience, for a given fieldwork site, may balance the fiscal benefit realized for the placement. A curriculum designed for students to be placed in their first fieldwork experience between their junior and senior years automatically provides a lesser benefit to a given fieldwork site than does a curriculum that permits a rotation of placement (i.e., with students beginning their fieldwork experience after their senior year).

References


