Cost–Benefit Analysis of Level II Fieldwork in Occupational Therapy

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

This cost–benefit study of Level II (professional-level) fieldwork included 180 student-supervisor pairs from 12 occupational therapy educational programs. Costs and benefits were measured in time (valued at market rates) spent by students in patient treatment and by supervisors in fieldwork-related duties. Various factors were also evaluated to determine their relationship to overall cost or benefit.

Results indicated a mean benefit of $4,700 for 12-week placements. Costs generated in the first few weeks of placement were generally recovered by the 6th week, with benefits gradually increasing, then declining slightly through the end of the fieldwork. Greater economic benefits resulted from physical dysfunction and psychiatric placements than from pediatric placements, and with second and third student experiences as compared with first experiences.

The rising cost of health care has been a major national concern in recent years. The increase in health care expenditures, up from 4.6% of the gross national product (GNP) in 1950 to approximately 10.5% of the GNP in 1985 (Arnett, Cowell, Davidoff, & Freeland, 1985), has been the impetus for the initiation of cost containment measures such as prospective payment systems (Curtin & Zurlage, 1984; Dowling, 1979). To adjust to the constraints imposed by these new payment systems, hospital administrators have begun to study all aspects of hospital expenditures to determine where costs can be reduced. One area scrutinized has been the costs attributed to clinical education for both medical and allied health students. This has become necessary because reimbursement agencies have shown resistance to continuing the payment of these costs (Chung, Spelbring, & Boisvenueu, 1980; Frum, 1986).

The accuracy of the assumption made previously that clinical education programs constitute an overall cost to health care institutions (Busby, Leming, & Olson, 1972; Pratt & Hill, 1960) is now being called into question. In this paper the results of a national study of the costs and benefits of Level II fieldwork in occupational therapy are presented. In addition to the overall findings of costs and benefits, variables that contribute to the net cost or benefit are also identified.

Review of the Literature

Cost–benefit analysis is a branch of normative or welfare economics in which the value or goodness of a project is evaluated by economic criteria. It is defined as “an attempt to ascertain the net benefit (total benefit less total cost) of a policy or project” (Sassone & Schaffer, 1978, p. 11). The process of a cost–benefit analysis involves the identification, valuation, and discounting of all costs and benefits across the lifetime of a project (including direct, indirect, and external effects) and the comparison of these costs and benefits. Once this comparison has been made, the economical desirability of the project can be evaluated (Prest & Turvey, 1965). The application of cost–benefit analysis has rapidly expanded in the health care sector (Warner & Hutton, 1980), where the lack of normal market incentives has permitted the skyrocketing of prices (Dittman & Smith, 1979; Klarman, 1974).

A few studies of the costs and benefits of clinical education programs have been conducted in both allied health and medical education, with emphasis on either time investments by students and supervisors (since the major costs have been defined in terms of personnel time rather than in terms of other factors) or on actual monetary costs and benefits. These stud-
similarly, porter and kincaid (1977) reported a study of the effect of the presence of medical students. In their study of time investments in allied health clinical placements, keim and carney (1975) found that supervisors perceived neither an overall benefit nor an overall cost as a result of placement of occupational therapy students in their fieldwork sites. Similarly, Chung et al. (1980) reported that fieldwork sites were breaking even with the placement of Level II occupational therapy fieldwork students. Burkhardt (1985) also reported roughly equal time investments on the part of supervisors and students in the Level II fieldwork placements at the University of Michigan Hospitals.

Through an analysis of the effect that student placements had on productivity, Leiken, Stern, and Baines (1983) found that the presence of occupational therapy, physical therapy, and radiology technology fieldwork students had a positive impact on productivity (number of treatment outputs) in clinical settings. Lapopolo (1984) found that physical therapy students on fieldwork assignment in the San Francisco area generated an average daily benefit of $89 per student, while Pobojeewski (1978) determined that radiology technology students generated a yearly benefit of more than $45,000 in the hospital he studied. Only Hammersberg (1982) reported an overall cost of fieldwork placement to the clinical facility as reported by the fieldwork supervisors in various technical level allied health fields.

Little is known about the variables that influence the costs or benefits of clinical placements. In their study of the effect of the presence of medical students on physicians' productivity, Pawlson, Watkins, and Donaldson (1980) found a greater loss in productivity associated with the more advanced students than with 1st-year students. In other words, loss in productivity was minimal when the student role was purely an observational one. However, Leiken et al. (1983) reported that Level II fieldwork students had a positive impact on productivity (treatment output) in the occupational therapy clinics studied whereas the presence of Level I students had no effect on productivity. Similarly, Porter and Kincaid (1977) reported differences in the degree of benefit derived from the placement of junior- and senior-level physical therapy students: Benefits were greater with seniors than with juniors.

Chung et al. (1980) compared the effects on costs and benefits of students in first versus second fieldwork assignments and found no difference between the two groups. Chung et al. concluded that expanded studies were needed to compare the costs and benefits of "undergraduate and graduate entry-level education; agencies that treat physical dysfunction, psychosocial dysfunction, and other categories of disability...and first, second, and third placements" (Chung & Spelbring, 1983, p. 687). These suggestions for further research, as well as certain portions of the methodology used in the study by Chung et al. (1980) formed the basis of the questions asked and the structure of the research reported here.

Purpose of the Study

The purpose of this study was to determine if there is an overall cost or benefit to the clinical sites as a result of Level II occupational therapy fieldwork placements. Additionally, the study was to determine whether selected variables are significantly related to the overall benefit or cost of the fieldwork placement.

Method

Identification of Costs and Benefits

Costs and benefits of Level II fieldwork were identified and valued strictly from the institutional (or fieldwork site) point of view. Direct costs included the time spent by the supervisor and other professional staff in preparation and supervision during the student placement. This included time spent in one-to-one supervision of the student, meetings, preparation and administration of the fieldwork experience, and in formal teaching or instructional sessions.

Other sources of possible cost were identified as the provision of room and board for students and the payment of stipends. Although data regarding these factors were gathered, they were not included in the overall cost-benefit equation because of the inconsistency in their occurrence from site to site and because of concerns about the ability to maintain confidentiality in the data collection phase. Finally, indirect costs, such as those associated with space and overhead, were considered marginal and were therefore not included.

Benefits were identified as arising from time spent by the student treating patients independently (in individual or group sessions), doing administrative work (including treatment planning and documentation), attending meetings, and performing clerical duties or the duties of an aide. Indirect benefits, such as recruiting advantages were viewed as marginal and were therefore not included in the cost-benefit equation.

Valuation of Costs and Benefits

Time spent by supervisors (cost) was valued according to the average charge per 15-minute treatment...
unit in the sites participating in the study. This was justified by the assumption that time not spent supervising students would be available to the institution for income generation in the form of treatment revenue. Similarly, time spent by students in the independent treatment of patients was also valued according to the 15-minute treatment charge, since institutions commonly charge the same amount for patient treatment regardless of who performs the treatment. However, time spent by students in group treatment was valued only at the rate of one treatment per 15-minute period; thus the students’ inexperience in coordinating the simultaneous treatment of several patients was taken into consideration.

Time spent by the students in other professional duties, such as attendance at meetings and treatment planning (administrative work) was valued according to the average salary of therapists at the participating institutions. Finally, students’ contributions in the form of clerical duties or the duties of an aide were valued at the current minimum hourly wage. These values were determined on the basis of what it would cost to replace the students by appropriate personnel in these functions and by taking into account that the students’ performance in Level II fieldwork is assumed to approach that of the entry level therapist (AOTA, 1985).

The following equations represent the calculations of costs and benefits in the study.

For costs, the equation is \( C = TG + M + P + I \).

For benefits, the equation is \( B = T(P + PI) + S(A + M) + W(D) \).

By subtracting the costs from the benefits, a single number, called the net present value (NPV) became the dependent variable. Ordinarily in a cost-benefit analysis, the net present value would be discounted over the lifetime of the project, but this step was eliminated because of the short lifetime (less than 1 year) of the fieldwork placement (Klarman, 1974). A positive NPV indicated an overall benefit, whereas a negative NPV indicated a cost to the fieldwork site. The equation to determine NPV was simply \( NPV = B - C \).

The Independent Variables

Of particular concern in the study were those factors that would contribute to the resulting NPV of the fieldwork placement. The degree level of the student (bachelor’s or basic master’s level), the age of the student, the number of fieldwork experiences, the type of fieldwork, and the week of fieldwork were identified as factors that could influence the overall cost or benefit.

It was believed that greater experience in life, academic studies, and fieldwork (the variables of age, degree level, and number of fieldwork experiences) might cause a student to perform more independently and thus bring about greater benefits while decreasing costs to the fieldwork sites. It was also speculated that different types of fieldwork settings might be structured to either foster or inhibit independence on the part of students and thus would affect the costs or benefits of placement. Finally, the variable of week of fieldwork was included, since it was found to affect the overall benefits in previous research (Chung et al., 1980). It could also be argued that as students gain skill and expertise in a particular fieldwork site, their value to the site increases.

Recruitment of Subjects and Data Collection

Directors of 12 occupational therapy educational programs agreed to participate in the study, and they provided the information, such as students’ and supervisors’ names and addresses, that was needed for implementing the study. Included were seven bachelor’s level programs and five basic master’s level programs, with a total of 384 students assigned to Level II fieldwork during the 1985 summer fieldwork period.

All students and their fieldwork supervisors in this group were contacted. Each student–supervisor

<table>
<thead>
<tr>
<th>Table 1</th>
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<tbody>
<tr>
<td><strong>Weekly Mean NPV (Expressed in Dollars) with All Variables Combined</strong></td>
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*Note: NPV = net present value.*
pair was asked to complete three, 1-week time logs indicating how much time the student spent treating patients and how much time the supervisor spent supervising students. The student’s log included items for recording time investment in the activities specified in the benefit equation, and the supervisor’s time log included items for time spent in the activities outlined in the cost equation.

Additionally, a questionnaire, sent to all participating fieldwork sites and completed anonymously, was used to determine therapists’ average annual salary, per-unit treatment charges, and the overall incidence of stipends, room and board subsidies, or other perquisites given to students on Level II assignments.

Analysis of the Data and Results

Responses from a total of 230 (60%) student-supervisor pairs were received. By using a method of sequential sampling of responses from the student-supervisor pairs, a final data set of 180 pairs was obtained. These pairs represented 156 clinical sites in 32 states.

Site questionnaires were returned from 167 fieldwork sites, but not all items had been completed on all questionnaires. With responses from 149 sites, it was found that the average salary for supervising therapists was $11.38/h. The average hourly treatment charge was $61.35, with 95 sites responding to this item.

The statistical analysis included the calculation of descriptive data and the use of a multiple regression analysis to determine the significance of each independent variable in predicting NPV while controlling for the covariates (Agresti & Agresti, 1979; Kerlinger & Pedhazur, 1973). Because previous research (Chung et al., 1980) and a preliminary review of the descriptive data indicated the possibility of a curvilinear relationship between week of fieldwork and NPV, a quadratic variable was added to the analysis to test for curvilinearity. In addition, because the variable of type of fieldwork is qualitative, with four types (or levels), it was evaluated separately using an F test to evaluate the increase in prediction it brought to the regression model.

Descriptive Analysis

Tables 1 to 5 show the descriptive results. In Table 1 the weekly mean NPV across all variables is given. This is followed by tables that demonstrate the mean weekly NPV for the following independent variables: degree level, week of fieldwork, number of fieldwork experiences, and type of fieldwork. These tables clearly indicate that the clinical sites in the study derived a financial benefit from the Level II fieldwork placement of occupational therapy students, with a mean weekly benefit of nearly $400, and a mean benefit from the 12-week and 13-week placements of $4,700 and $4,850, respectively. This benefit appeared to exist regardless of degree level, number of fieldwork experiences, or type of fieldwork, although some differences appeared to exist among these groups.

Results from the site questionnaire regarding payments or perquisites given to students in return for their work in Level II fieldwork indicated that 40% of...
the sites provided either room or board benefits for students, with the mean value of these benefits estimated at $36 per week. Only six sites (10%) reported providing stipends, which averaged $75 per week. An additional 10% indicated that room-and-board benefits plus some financial remuneration were provided; the average value of these benefits was $58 per week.

### Inferential Analysis

The results of the regression analysis are given in Tables 6 and 7. Of the independent variables built into the model, the variables of number of fieldwork experiences and week of fieldwork and the quadratic variable indicating curvilinearity between week of fieldwork and NPV were found to be significantly related to the NPV. Conversely, no relationship was found between degree level and NPV and between students' age and NPV.

Significance was also found in adding the variable of type of fieldwork to the model ($p < .05$). Differences found between the specific types of fieldwork are shown in Table 7. A significant difference occurred between NPVs in physical dysfunction and pediatric fieldwork placements were found to generate benefits similar to the benefits generated by physical dysfunction placements.

Figure 1 illustrates the relationship between NPV and the variables of week, type of fieldwork, and number of fieldwork experiences. The incidence of first fieldwork assignments in pediatric settings was nil; therefore, this particular combination was not graphed. Curves for psychiatric and geriatric fieldwork placements would be similar to those for physical dysfunction placements.

In considering the effects of the number of fieldwork experiences on NPV, it is clear that as a student gains in experience, the fieldwork site benefits. With the more experienced student, the supervisor has to invest less time in the early weeks of the fieldwork placement; thus, an earlier break-even point occurs. For example, the student on a second fieldwork placement in a physical dysfunction setting would be expected to generate an overall financial benefit for

### Discussion

From the descriptive and statistical analysis, it is apparent that, with the possible exception of pediatric placements, a 12- or 13-week Level II fieldwork placement brings about an overall benefit to the fieldwork site. As a result of the time invested in orienting and teaching the student, a cost is incurred during the first few weeks of the placement. This cost is subsequently recovered between the 3rd and 5th weeks (see Figure 1). From this point on, the placement becomes an overall benefit to the fieldwork site, generating increasingly greater weekly benefits until the last few weeks. As the end of the fieldwork approaches, the degree of benefit levels off, then declines somewhat in magnitude. This is possibly the result of activities associated with the end of fieldwork: the reassignment of patients to regular clinical staff and the evaluation of students' fieldwork performance.

In Table 5, Mean NPV (Expressed in Dollars) by Type of Fieldwork

<table>
<thead>
<tr>
<th>Type of Fieldwork</th>
<th>Mean</th>
<th>SD</th>
<th>Minimum Value</th>
<th>Maximum Value</th>
<th>SEM</th>
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</thead>
<tbody>
<tr>
<td>Physical Dysfunction (n = 77)</td>
<td>520.47</td>
<td>734.50</td>
<td>-114.50</td>
<td>2069.00</td>
<td>83.70</td>
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<td>63.63</td>
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<td>-69.00</td>
<td>559.00</td>
<td>137.50</td>
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<td>Psychiatric (n = 91)</td>
<td>315.57</td>
<td>547.60</td>
<td>-98.60</td>
<td>1347.00</td>
<td>57.40</td>
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<tr>
<td>Geriatric (n = 4)</td>
<td>540.25</td>
<td>688.14</td>
<td>-75.00</td>
<td>1014.00</td>
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Note. NPV = net present value.

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Note. NPV = net present value.
The fieldwork site by the 3rd week of placement, as opposed to a student on a first fieldwork placement who would be expected to generate an overall financial benefit by the 5th week of placement.

While differences are found in NPV between types of fieldwork settings, it is suggested that these results be viewed cautiously. In this study, the pediatric sites were not able to break even until the conclusion of a 13-week placement even with students in their second fieldwork assignments. A more acceptable benefit was generated by students in their third fieldwork placements. While highly significant differences between NPVs for physical dysfunction and pediatric settings were revealed ($p < .0065$, mean difference of $605.91$), it must be noted that only eight observations were obtained from pediatric settings, as opposed to 77 observations from physical dysfunction settings. Although the results give a strong indication

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**Figure 1**

Relationship of Week to NPV for Specific Types of Fieldwork and Number of Fieldwork Experiences

<table>
<thead>
<tr>
<th>WEEK</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>
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<tbody>
<tr>
<td>NPV</td>
<td>-100</td>
<td>1</td>
<td>B</td>
<td>A</td>
<td>200</td>
<td>2</td>
<td>300</td>
<td>3</td>
<td>(2)</td>
<td>1</td>
<td>400</td>
<td>(1)</td>
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<td></td>
<td>-200</td>
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<td>B</td>
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**Note:** NPV = net present value; 1 = physical dysfunction, 1st experience; 2 = physical dysfunction, 2nd experience; 3 = physical dysfunction, 3rd experience; A = pediatrics, 2nd experience; B = pediatrics, 3rd experience. Value marked ( ) indicates week when benefits overcome costs.
that a real difference exists between pediatric placements and other types of placements, additional research, with a greater number of participants, is needed to more carefully evaluate this difference.

The benefits of greater academic experience (basic master's degree as compared with bachelor's degree) had no relationship to the overall financial effect of fieldwork to the clinical sites. However, this study compared only one quantitative aspect of performance between bachelor's and basic master's level students. There are possibly other differences, perhaps in the areas of quality of care and knowledge base, between these two educational levels that could influence the delivery of patient care services but were beyond the scope of this study.

The variable of age was not predictive of the overall cost or benefit of fieldwork placement. It seems that the greater life experience of older students was of no particular advantage in facilitating more independent functioning or in lessening costs to fieldwork sites.

Finally, the relatively small costs (average of $36 to $75 per week) of stipends or other perquisites as payment for students' work in Level II fieldwork had little impact on the overall financial benefit to the clinical sites, with the possible exception of pediatric placements. The major impact of perquisites would be to delay the break-even point of the fieldwork placement by a maximum of 1 week.

This research supports the conclusions of previous research on the cost and benefits of fieldwork education and largely refutes the argument that Level II fieldwork constitutes a cost to the clinical sites. This study carries greater weight than previous studies because a more representative sample of the population was used, encompassing a greater number of study participants and 20% of the accredited occupational therapy educational programs.

Educators should be cognizant of the importance of length of fieldwork and number of fieldwork experiences as factors in planning fieldwork experiences. Fieldwork placements of 6 weeks or less would likely bring about a cost to the clinical site and should be avoided, particularly when they are first fieldwork assignments. Some flexibility exists in establishing placements that are longer than 6 weeks, since most placements (other than pediatric) will at least break even beyond this point. Fieldwork sites that are known to require a great amount of student instruction during the first few weeks would probably be more appropriate for longer assignments so that a benefit to the clinical site could be assured.

The research results give preliminary indication that the special case of pediatric fieldwork would require a full 12-week assignment for the clinical site to break even from a cost-benefit point of view. If pediatric sites would accept only third fieldwork placements, these sites would be able to gain some benefit from their time investment. More importantly, however, it appears that further research is warranted (a) to determine the specific aspects of pediatric assignments that make them more costly and (b) to determine what adjustments can be made in the educational process to decrease these costs to the clinical sites.

Summary

Variables in this study that were identified as possibly relating to cost or benefit of fieldwork were age of student, degree level (bachelor's or basic master's), type of fieldwork, week of fieldwork, and number of fieldwork experiences. A total of 384 student-supervisor pairs were contacted from 12 participating occupational therapy educational programs, 180 of which were included in the data analysis.

Results supported previous research in refuting the assumption that Level II fieldwork brings a fiscal burden to fieldwork sites. In fact, an overall mean benefit to the fieldwork sites of approximately $400 per week, or $4,700 to $4,850 for 12- or 13-week assignments was discovered. A curvilinear relationship was found between week of fieldwork and NPY, with early weeks of the fieldwork generating a cost to the clinical sites and later weeks bringing increasing benefits. These benefits were found to level off and decline slightly during the final weeks of the placement. The type of fieldwork placement and the number of fieldwork experiences were found to be significant in predicting the cost-benefit relationship, with specific differences found between physical dysfunction and pediatric placements and greater benefits found for longer fieldwork experiences.

The results suggest that educators should consider length of fieldwork assignments in light of factors such as type of fieldwork and number of fieldwork experiences to assure that fieldwork sites recover their initial investments in student training. Assignments of a minimum of 6 weeks are recommended for first fieldwork placements, with longer assignments suggested for pediatric or other placements known to be difficult.

Acknowledgments

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References


