The Impact of Service-Learning on Two Groups of South African Dental Students


Abstract: Service-learning has become an important component in the education of medical and dental students around the world. Dental students at the University of Witwatersrand, South Africa, provide dental services to rural communities via the Phelophepa train or a Public Oral Health Facility (POHF). The Phelophepa train is a mobile primary health care facility offering dental, pharmacy, nursing, and medical services provided by health professions students. The objective of this study was to determine the impact this experience with service-learning has had on dental students. Final-year dental students in 2008 and 2009 participated in the study by completing a self-administered questionnaire. There was a 100 percent response rate (N=55) on the demographic questions and a 98 percent response rate (N=54) on the opinion questions. Students on the Phelophepa train performed more extractions and examinations than those at the POHFs. Most students (95 percent), both on the train and at the clinics, reported that their clinical skills and efficiency had improved, and 96 percent felt more aware of the communities' needs. Almost all the students (96 percent) reported that the experience had helped them define their personal strengths and weaknesses. Complaints they mentioned included large numbers of patients (87 percent), long working hours (60 percent), and equipment being inadequate (48 percent) or not working (40 percent). This program positively impacted these students and enhanced their personal growth and social responsibility by exposing them to the needs of rural and urban communities in South Africa.

Keywords: community health services, community dentistry, community-based dental education, dental students, public health, service-learning, South Africa

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Service-learning has become an important component in the education of medical and dental health professionals around the world. Service-learning is a type of experiential education in which students deliver services to underserved communities but also reflect on their involvement in such a way as to gain understanding of course content, the discipline, and its relationship to social needs, as well as an enhanced sense of civic responsibility. In addition, service-learning should fulfill the following essential roles: students' learning must be enhanced by the service; both students and the community must benefit; students should reflect and provide feedback on their experience in order to improve and sustain the process; and there must be a partnership among the communities, service sites, and the university in which all stakeholders both contribute and benefit.

Service-learning was introduced for dental students as early as 1980 in South Africa. The rationale for its introduction was to expose students to various communities and allow them to work away from the confines of academic institutions. Each of the dental schools in South Africa has adapted to its own socioeconomic environment and put into place relevant and practical service-learning outreach activities. These activities include placing dental students at public oral health facilities, mobile dental units, satellite dental clinics, crèches, and primary schools. These outreach activities offer dental students the opportunity to provide dental services to rural, urban, and suburban communities, many of whom do not have access to oral health care. The South African Department of Education has promoted and supported the implementation of service-learning programs.
as a mission of higher education institutions and emphasized the development of social responsibility and awareness for their students.3

The dental curriculum in South Africa consists of a five-year program with an additional one year of community service. During the five years, students spend their clinical time providing services within the dental hospital under supervision and have minimal contact with other medical disciplines. Final-year dental students have participated in formal service-learning outreach programs since 2003 and are assigned to the Phelophepa Health Care Train or a Public Oral Health Facility (POHF) in the province in which the dental school is located. These activities consist of a two-week, full-time rotation in which students either reside on the train or travel to a POHF on a daily basis. These sites are evaluated annually and must meet minimum criteria as prescribed by the stakeholders. The criteria are similar to those reported by Hryhorczuk et al.4 in 2008 and include a five-day operational structure, sufficient instruments and materials for basic oral health care services, full-time dentists willing and able to supervise students, at least one chair available per student, and proper infection control policies.

The Phelophepa train is an outreach program that provides service-learning for several health-related disciplines including optometry, pharmacology, oral health, psychology, and nursing. Dental, dental therapy, and oral hygiene students from the dental schools offer oral health services, which are an integral component of the train’s holistic health care. The Phelophepa train is financed by private and public companies and has the approval of the South African government under the auspices of its Department of Health and Social Development. The train operates from 7:30 am to approximately 6:00 pm each day, depending on patient load and type of services. The train serves underprivileged rural communities throughout South Africa and provides basic primary oral health care, including relief of pain and sepsis, extractions, restorations, oral hygiene instructions, and scaling and polishing. Students are transported to and from the train and reside there for two weeks. The train remains at a particular station for two weeks and then moves to another location. The route of the train is determined annually, and the organizers attempt to visit each station once every two years. Whilst at the station, all the patients who appear are examined and treated.

The second type of assignment, at a POHF, allows students to work in a community setting outside the dental school. It also prepares them for their upcoming compulsory year of community service at a designated public health facility. There are eighteen clinics located within the Gauteng province, and students choose one depending on distance from their place of residence. These facilities are staffed by dentists, oral hygienists, and dental assistants and provide free basic primary oral health care. The clinics operate from Monday to Friday between 8:00 am and 4:00 pm.

Although service-learning programs have been integrated into the dental curriculum for almost fifteen years, the impact of this activity on the students’ academic, personal, and civic responsibilities has not been evaluated. Furthermore, there has been no formal evaluation of the challenges faced nor the services delivered by students on these programs. This study is the first to evaluate the service-learning program for final-year dental students at the University of Witwatersrand using three recognized domains: academic development, personal development, and civic responsibility.5 These three domains have been used in the past to evaluate service-learning programs as they encompass the objectives and rationale for placing students in a service-learning activity. The specific aim of the study was to determine the impact that service-learning on the Phelophepa train and POHFs had on final-year dental students in 2008 and 2009. We determined the demographics of participating students; the type of services delivered and challenges they faced; and the impact this experience had on their academic, personal, and civic development.

Methodology

This retrospective cross-sectional descriptive study utilized a mixture of qualitative and quantitative methods. A self-administered questionnaire was hand-delivered to all the dental students (N=55) who participated in the service-learning program during the study period (2008 and 2009). The questionnaire was adapted from the Community University Partnerships Survey at the University of Witwatersrand, which was based on a questionnaire developed by Gelmon et al.6 This questionnaire has been used by many faculties within the University of Witwatersrand, including engineering, teaching, and health sciences, and has consistently been found to be relevant and practical for the South African context.

Once the entire group of students had completed the two-week rotation, they were given the
questionnaire along with a blank envelope. After completing the questionnaire, the students placed it into the envelope, sealed it, and handed it in.

The questionnaire was composed of thirty-four questions divided into three sections. The first two sections included open- and closed-ended questions on students’ demographics and challenges they faced during the program. The third section (on academic, personal, and civic responsibilities) consisted of statements for which students had the option of agreeing (score of +1), remaining neutral (0), or disagreeing (-1). The scores were then tallied and grouped for data analyses. The results were analyzed using descriptive statistics. Comparisons and correlations were determined between the two years and the service-learning activities using the chi-square and Fischer exact tests. The responses from the open-ended questions were grouped, and common themes identified. Ethical clearance was obtained for the study from the University of Witwatersrand Ethics Committee.

Results

There was a 100 percent (N=55) response rate on the demographic questions and a 98 percent response rate (N=54) on the opinion questions. Demographic data are shown in Table 1. The majority (72 percent) were female, and 88 percent were between twenty and twenty-five years of age. Thirty students (55 percent) worked on the train, and twenty-five (45 percent) worked at a POHF. All thirty students (100 percent) on the train worked more than eight hours per day compared to only two (8 percent) students who reported working more than the normal eight-hour day at the POHFs.

Almost two-thirds (60 percent) of the students were Indian; 26 percent were white; and 14 percent were black. (Note that, prior to 1994, all people in South Africa were classified African, Indian, Coloured, or White according to the Population Registration Act of 1950. The use of these terms does not support the legitimacy of this racist terminology, but is necessary for highlighting the impact of former apartheid policies on people in this country.)

The procedures performed on the train and the clinics are shown in Figure 1. Extractions were the most common procedure followed by restorations at both sites. On average, the students performed twenty extractions and three restorations per day, with an extraction to restoration ratio of seven to one. Students at the clinics performed, on average, slightly more restorations (four) than those on the train (two). The extraction to restoration ratio on the train was 9.5:1 compared to that at the clinics, which was 5.3:1.

The most common problems as perceived by the students are shown in Figure 2; these differed between the two types of site. More than half of the students (60 percent) on the train complained of working up to ten hours per day, and 87 percent reported treating more than thirty patients per day. The most frequent problems reported at the POHFs were insufficient equipment (48 percent) and dysfunctional equipment (40 percent).

In general, all of the students (100 percent) found the service-learning program to be meaningful and productive, as expressed in their positive feedback. Some of the common problems raised by students on the train, as described in the open-ended questions, were accommodation, number of patients, ablution facilities, and dietary requirements that were not accommodated. Many students complained about cleaning the suction unit on a daily basis, a task they liked the least on the train. Those at the POHFs reported a lack of functional equipment as the biggest concern. The positive aspects included building confidence, making clinical judgments independently, working with different groups of people, exposure to rural sites and communities, and working with

| Table 1. Demographic data on students by number and percentage for the two-year study period (N=55) |
|---------------------------------|-----------------|-----------------|-----------------|-----------------|
| Location                       | 2008            | 2009            | Total           | p-value         |
| Students on the Phelophepa train | 16 (53%)        | 14 (47%)        | 30              | p>0.05          |
| Students at the POHFs          | 10 (40%)        | 15 (60%)        | 25              | p>0.05          |
| Gender                         |                 |                 |                 |                 |
| Males                          | 8 (53%)         | 7 (47%)         | 15              | p>0.05          |
| Females                        | 20 (50%)        | 20 (50%)        | 40              | p>0.05          |
| Average age in years           | 23              | 24              |                 |                 |
a supervisor who was helpful and willing to teach students various techniques and treatment modalities. Those at the POHFs reiterated many of these positive aspects and felt that, in addition to improving their clinical skills, the experience exposed them to public dental facilities that prepared them for their year-long community service.

Table 2 shows the breakdown of responses regarding academic and personal development and civic responsibilities by students on the train and at the POHFs. The majority of students, irrespective of where they performed their service-learning activity, reported an improvement in attitudes toward their academic, personal, and civic responsibilities. Most of the students (95 percent), both on the train and at the POHFs, reported that their clinical skills and efficiency had improved, while 96 percent felt more aware of the communities’ needs and 94 percent felt more aware of their role within the communities. Almost all of them (96 percent) realized that working in the communities helped them define their personal strengths and weaknesses, and 88 percent felt that their leadership skills were enhanced. A correlation analysis was performed to identify if variables such as gender, age, and race were associated with one or more of the objectives. None were found to be statistically significant (p>0.05).

![Figure 1. Number and type of services delivered on average by each student per day](image1)

![Figure 2. Number of common problems reported by students on the train and at POHFs](image2)
Discussion

All the students who participated in the service-learning program responded to the questionnaire. Almost three-quarters (72 percent) were female, which reflects the current gender breakdown of dental students at this university. All the students on the train worked for more than eight hours per day as a result of the large number of patients who presented for services and the resulting heavy workload. Prior to being assigned to the train, the students were informed about the long working hours that resulted from the needs and demands of the communities visited. The students at the POHFs worked an eight-hour shift as these facilities operate daily between 8:00 am and 4:00 pm.

The greater number of extractions compared to restorations was indicative of services offered in the public sector in South Africa. These students at the POHFs performed, on average, more restorations (four) per day than those on the train (two), probably due to staff members at the POHFs making specific attempts to allocate time and patients for restorative treatment. Because of the high demand for services on the train, the limited staff, and time constraints and the fact that patients cannot return for follow-up appointments, students needed to provide quick and effective treatment and hence carried out more extractions and fewer restorations. This pattern is similar to that of another study that found high service demands and inadequate staff resources affected the type of services offered. In the past, the staff at the POHFs offered more restorations and preventive services such as toothbrush programs at schools, but more recently, the focus has been on extractions and removal of pain and sepsis. This is due to the enormous burden of untreated caries in disadvantaged communities, as reported by van Wyk et al.

Most of the students on the train (87 percent) reported working long hours and treating large numbers of patients. Since the train has a fixed schedule and resides in a community for two weeks only, many patients from the surrounding area attend for a wide variety of health care services. The majority of these patients lack any other access to oral health care, so the train is their only option for receiving care. Therefore, those providing services on the train must treat all the patients who present for care, even

<table>
<thead>
<tr>
<th>Determining academic development</th>
<th>Participating in the outreach activity has helped me better understand theory from my lectures.</th>
<th>33 (61%)</th>
<th>18 (33%)</th>
<th>3 (6%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Participating in the outreach activity made me take responsibility for my own learning.</td>
<td>40 (74%)</td>
<td>12 (22%)</td>
<td>2 (4%)</td>
</tr>
<tr>
<td></td>
<td>My outreach activity made me more aware of the roles we play in other disciplines.</td>
<td>48 (88%)</td>
<td>5 (9%)</td>
<td>1 (2%)</td>
</tr>
<tr>
<td></td>
<td>The work I performed in the community enhanced my ability to communicate my ideas in a real context.</td>
<td>50 (93%)</td>
<td>3 (6%)</td>
<td>1 (2%)</td>
</tr>
<tr>
<td>Assessing personal development</td>
<td>During this experience I became comfortable working with people different from myself.</td>
<td>49 (91%)</td>
<td>4 (4%)</td>
<td>1 (2%)</td>
</tr>
<tr>
<td></td>
<td>Participating in the community enhanced my leadership skills.</td>
<td>48 (88%)</td>
<td>5 (9%)</td>
<td>1 (2%)</td>
</tr>
<tr>
<td></td>
<td>Doing work in the community helped define my personal strengths and weaknesses.</td>
<td>52 (96%)</td>
<td>1 (2%)</td>
<td>1 (2%)</td>
</tr>
<tr>
<td></td>
<td>Working away from dental school made me aware of my own biases and prejudices.</td>
<td>37 (69%)</td>
<td>14 (26%)</td>
<td>3 (6%)</td>
</tr>
<tr>
<td>Evaluating civic responsibility</td>
<td>This experience made me more aware of the needs of the community.</td>
<td>52 (96%)</td>
<td>1 (2%)</td>
<td>1 (2%)</td>
</tr>
<tr>
<td></td>
<td>I have a responsibility to serve the community.</td>
<td>46 (85%)</td>
<td>6 (11%)</td>
<td>2 (4%)</td>
</tr>
<tr>
<td></td>
<td>My outreach experience has made me aware of my role in the community.</td>
<td>51 (94%)</td>
<td>3 (6%)</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>I will integrate community service into my future plans.</td>
<td>40 (74%)</td>
<td>13 (24%)</td>
<td>1 (2%)</td>
</tr>
</tbody>
</table>

N=54
if it means working more than eight hours per day. Another factor that could contribute to the extended working hours is the longer time taken by students to complete some procedures such as extractions. As final-year students, they are not accustomed to treating so many patients in a day and work more slowly than experienced clinicians.

At the POHFs, students complained mostly about equipment being insufficient or broken. Many facilities have old equipment that often breaks down and is not repaired because of inadequate budgets for maintenance. On the positive side, many of these facilities are being upgraded, and new equipment will be installed as funds become available.

The students reported that the experience had a positive impact on three domains of service-learning: academic development, personal development, and civic responsibility. With regard to academic development, 66 percent felt they were better able to apply and understand the theories and principles they had learned previously as a result of the community activity. The three students who felt they could not relate theory to the practical work could be a result of performing mainly extractions and restorations, procedures that have been taught and mastered by their third year of study. The majority (92 percent) reported being more aware of their role in a multidisciplinary team able to provide holistic, quality health care to patients. The students worked with nursing and pharmacy students who provided health promotion and dispensed medications to patients. The experience also gave the students a greater appreciation of translating theory into practical applications within “real-world” situations. This effect is similar to that in the study by Burrows et al., who found that outreach projects helped students improve their practical clinical skills.

When assessing their personal development, over 90 percent of the students recognized the value of a multidisciplinary approach to holistic health care, noting that it clarified their role in a multidisciplinary team and they felt comfortable working with students from other disciplines. Eighty-eight percent reported their leadership skills were enhanced, and 96 percent reported that the experience helped them define their personal strengths and weaknesses. This could be as a result of working with supervisors who gave them more freedom, allowed them to make decisions on their own, and were not as rigid as faculty members in the dental school environment. This finding was similar to that of a study in which the majority of the participants reported improved personal growth and saw the service-learning program as providing invaluable life lessons.

The responses to the statements regarding civic responsibility showed that the students viewed community work positively; this could likely be due to the service-learning activity. Even though most of the participants (94 percent) reported that they understood their role more clearly, 24 percent were unsure as to how they would integrate community service into their future plans. Nevertheless, this activity exposed them to various communities and allowed them to work with diverse populations so that 96 percent were made more aware of the needs of communities; this was similar to results reported by Fitch.

This study carried out on two cohorts of final-year dental students should be repeated on an annual basis so that the service-learning program is constantly evaluated and monitored. This will ensure that the program is beneficial for the students, staff, and communities.

Conclusions

In our study of students’ work in community-based dental education, the students delivered basic but much needed primary oral health care, with extractions, examinations, and oral hygiene instructions as the most common procedures. Although the students complained about long working hours, the high volume of patients, and equipment not working or insufficient, these issues did not diminish the positive impact of their service-learning experience. The students delivered relevant and meaningful care that related academic content to the real world. This strengthened their sense of responsibility towards their studies and had a positive impact on their attitudes regarding care for underserved communities. The overall positive feedback from the students should spur higher education institutions to initiate and sustain projects like the Phelophepa train and community clinics for improving students’ skills and helping them develop positive attitudes about community health.

REFERENCES


