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Service-learning's impact on dental students' attitude to community service

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SERVICE-LEARNING'S IMPACT ON DENTAL STUDENTS' ATTITUDE TO COMMUNITY SERVICE

by

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CERTIFICATE OF APPROVAL

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MASTER'S THESIS

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This is to certify that the Master's thesis of

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To Joon, Austin, Justin, and my parents who endured sacrifices and greatly supported my personal and professional growth with everlasting love and dedication
To the Lord who loves me and shows the purpose of my life

And let us not grow weary of doing good,
for in due season we will reap, if we do not give up

Galatians 6:9

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ABSTRACT

This study is aimed to evaluate service-learning program's impact on senior dental students' attitude to community service at Virginia Commonwealth University (VCU) School of Dentistry. Experience gained through service-learning in dental school may positively impact dental students' attitude to community service that will eventually lead into providing care to the underserved. Two surveys were administered to 105 senior dental students. For the first survey (post-test), students reported their attitude to community service after the service-learning program completion. For the second survey (pre-test), students reported their attitude prior to the program *retrospectively*. Seventy six students responded to the post-test and fifty six students responded to the pre-test. A repeated-measure mixed-model analysis indicated that overall there was a change between pre-test and post-test. A significant pre-test and post-test difference was found in five scales: *connectedness, normative helping behavior, benefits, career benefits, and intention*. A relationship between attitude to community service and student characteristics such as age, gender, ethnicity, and volunteer activity was also examined. Only ethnicity showed a significant difference. In conclusion, service-learning program at VCU School of Dentistry has positively impacted senior dental students' attitude to community service.

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CHAPTER I

INTRODUCTION

Study purpose and its significance

Oral Health in America, the surgeon general's report in 2000, raised concerns about oral health disparities in the U.S. The report mentioned that certain segments of the population, such as the elderly, very young children, the poor, and people who are medically compromised, face significant barriers to access oral health care and are much more likely to have poorer oral health (U.S. Department of Health and Human Services, 2000). An oral health workforce who are appropriately trained and willing to treat these vulnerable populations can help alleviate the barrier to access to care and eventually reduce oral health disparities.

Dentists' willingness to treat the underserved and their behavior can be shaped during dental school (P. L. Davidson, 2009; Smith, Ester, & Inglehart, 2006). More exposure and experience in providing care to the underserved, especially in community settings other than dental school (a.k.a. community-based dental education), can greatly improve dental students' awareness of community needs, attitude towards community service, and willingness to provide care to the needy as part of the community service. As a result, training more socially responsible dental professionals has become an integral part of the dental education in the U.S.

Community-based dental education has a long history that has evolved to service-learning that emphasizes a balance in community service and learning/reflection (Yoder, 2006)(Furco, 1996b). One of the objectives of service-learning is to change students' attitude towards community service so that they continue to volunteer to meet community needs after graduation. However, there is very limited data available regarding service-learning and dental students' attitude to community service.

The purpose of this study is to evaluate the impact of the service-learning program to senior dental students' attitude toward community service at Virginia Commonwealth University (VCU) School of Dentistry (SoD) in the academic year 2011-12. The relationship between students' characteristics and attitude towards community service will also be assessed. The study findings will contribute to the knowledge about the benefits of service-learning in dental education, provide information about improving the future oral health care workforce's attitude to community service that can eventually help reduce oral health disparities and inform dental educators as to how service-learning programs can be enhanced to better meet its learning objectives. In addition, conducting systematic scientific research to validate a service-learning program's outcomes will increase confidence among service-learning practitioners on demonstrating benefits of such a program and provide solid justification to those who support expansion of such programs.

CHAPTER II

LITERATURE REVIEW

Overview

This study was aimed to fulfill two purposes. First purpose was to measure service-learning's impact on dental students' attitude to community service. Second purpose was to assess the relationship between student characteristics and their attitude to community service.

This literature review will begin with the definition of service-learning. Since service-learning is relatively new in dental education but has been developed and used in education in other disciplines for a longer period of time, service-learning definitions in education in general will be introduced first in conjunction with distinctions among similar terms or concepts then definitions of service-learning that have been used in dental education will be addressed. Explanations on components and principles of service-learning will follow. Based on a solid understanding of what service-learning means, this literature review will bring a conceptual framework of how service-learning can impact students' attitude towards community service and their behavior.

In the next section, history of service-learning in the United States and other countries and service-learning across different disciplines such as higher education in general, medical field, and dental education will be discussed. Finally, a detailed description of the service-learning program at VCU School of Dentistry will be described.

Then, the need for evaluating service-learning will be discussed with examples of published evaluations of service-learning. Since there is limited knowledge regarding service-learning in dental education, articles related to community based dental education were selected for review. Gaps in the literature will be identified which again justifies need for this present study.

In the final section of this literature review, community service attitudes scale (CSAS) which is used for this study will be introduced.

Definition of Service-learning

Numerous scholars and educators have attempted to define service-learning. Bringle and Hatcher defined it as "course-based, credit-bearing educational experience in which students (a) participate in an organized service activity that meets identified community needs and (b) reflect on the service activity in such a way as to gain further understanding of the course content, a broader appreciation of the discipline, and an enhanced sense of civic responsibility" (Bringle, Phillips, & Hudson, 2004). Furco defined it as "a structured learning activity in which community service is combined with academic objectives and each of these components is given equal weight" (Furco, 1996). Jacoby summarized various attempts to define service-learning as "a form of experiential education in which students engage in activities that address human and community needs together with structured opportunities intentionally designed to promote student learning and development" (Jacoby, 1996). "Learn and Serve: America's National Service-Learning Clearinghouse" defines service-learning as a teaching and learning strategy which emphasizes mutual relationship between an educational institution and the community it is serving and integrates meaningful community service with instruction and reflection (Learn and serve America's national service-learning clearinghouse, 2011). Hood stated that the three core goals of service-learning are improving education, promoting civic engagement, and addressing societal needs. Hood also emphasized the combination of required learning objectives for students as well as services to the community and differentiation between service-learning and other experiential learning (Hood, 2009).

While there are numerous attempts to define service-learning, the Commission on National and Community Service (CNCS, 1993) provides the most widely-accepted and comprehensive definition.

> A service learning program provides educational experiences:
> a. under which students learn and develop through active participation in thoughtfully organized service experiences that meet actual community needs and that are coordinated in collaboration with school and community;
> b. that are integrated into the students' academic curriculum or provides structured time for a student to think, talk, or write about what the student did and saw during the actual service activity;
> c. that provide a student with opportunities to use newly-acquired skills and knowledge in real-life situations in their own communities; and
> d. that enhance what is taught in school by extending student learning beyond the classroom and into the community and helps to foster the development of a sense of caring for others.

All these definitions point out service-learning activities that attain two goals simultaneously: 1) to benefit community stakeholders/partners (agency, clients, and community residents) and 2) to meet the instructor's educational goals. Thus, the service-learning activities establish a reciprocal relationship between community partners and campus instructors. Zlotkowski stated that in successful service-learning activities campus instructors ensure that the service experience is consistent with the course goals and objectives and community partners ensure that student activities are consistent with their goals and needs (Zlotkowski, 1999).

Distinctions between Service-learning and similar terms

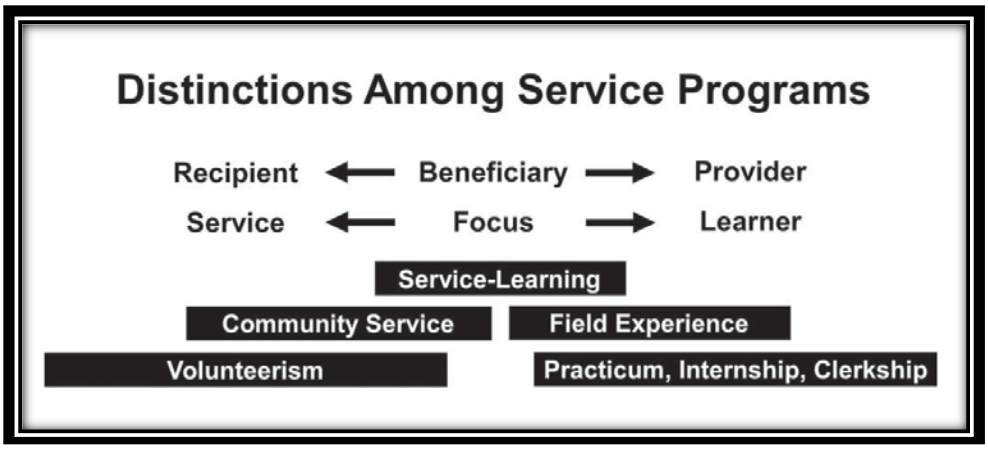
As a type of experiential learning, service-learning is similar to internships, field education, practica, community service, and voluntary service. Furco (1996) tried to explain the differences by putting them in a continuum. Internship and practica focus on students' gaining experience and career development while *volunteer* activities focus on civic involvement and the services rendered. Furco placed service-learning in the middle

of the continuum and mentioned that service-learning is unique in that it is intended to "equally benefit the provider and the recipient of the service as well as to ensure equal focus on both the service provided and the learning that is occurring" (Furco, 1996a). However, Bringle et al.(2004) stated the most distinctive aspect of service-learning compared to other experiential educational modalities is that the class is deliberately designed to have civic engagement as an educational goal and through this class students develop an understanding of their current and future role in their community (Bringle et al., 2004).

On the other hand, *community service* can have a very broad meaning and often refers to a court-ordered service after a civic law violation rather than an educational method. Because of this punitive connotation of the word, *community service* is not used by service-learning supporters. *Community-based learning* also refers to learning that occurs outside the classroom setting such as outdoor education, field trips, internships, preceptorships, and apprenticeships but does not have a service component.

Figure 1 graphically shows distinctions among different programs as discussed previously. It emphasizes that service-learning balances the recipient and providers as beneficiaries and service and learning at the same time as a focus. Furco's illustration also coincides with CCPH's definition of service-learning.

Figure 1: Distinctions among Service Programs



(Source: Furco A. Service-learning: a balanced approach to experiential education. At www.floridacompact.org/pdf/resources/SL-ABalanced Approach.pdf.)

From a pedagogical point of view, service-learning is comparable to newer trends in higher education such as collaborative learning, problem-based learning, and diversity education. Like these newer educational modalities, service-learning is regarded as a paradigm shift because it emphasizes students as constructors of knowledge and transfers the instructor from being the center of the instruction to a facilitator of learning that occurs outside the classroom.

Components of Service-learning in Clinical Education

Equal Importance of Service and Learning and Reciprocity

The hyphen linking of the words “service” and “learning” emphasizes that service and learning are equal and interdependent (Logan, 1997). In service-learning, a balance between service and learning objectives are achieved by emphasizing a reflective component, reciprocal learning, developing citizenship skills, achieving social change,

and addressing community-identified needs through involvement of community partners (Hagel & Rayport, 1997). This balance necessitates schools and community partners to negotiate their goals and objectives (Seifer, 1998). Service-learning is NOT "required volunteerism" – the learning that occurs through volunteerism is not structured and volunteerism does not attempt to balance service and learning (Hagel & Rayport, 1997). In service-learning, traditional definitions of "faculty" or "teacher" are not clear. In certain settings, community members function as a "teacher" to help meet students' learning objectives while providing service to those in need (Seifer, 1998). It is also critical that students address community-identified needs rather than doing the same projects repeatedly regardless of what the community needs (Seifer, 1998).

Structured Reflection

Structured reflection is a critically important component of the service-learning process (Parsons, Felton, & Chassie, 1996),(Marcus, Zenty, & Adelman, 2009) while traditional clinical education in health professions emphasized observing and doing rather than the learner's critical thinking and reflection. Through reflection students are encouraged to connect their service experience and learning. Dialogue, journals, stories, and blogging are means to engage students in structured reflection. It is also important that the structured reflection is designed and directed to help students plan for the future and it needs to be continuous, contextual, challenging, and connected in order to be effective (Yoder, 2006).

Principles of Service-learning

In the *Wingspread Special Report* (1989), The Johnson Foundation created ten principles that often guide service-learning programs. The effective service-learning program is one that:

1. Engages people in responsible and challenging actions for the common good.
2. Provides structured opportunities for people to reflect critically on their service experience.

3. Articulates clear service and learning goals for everyone involved.
4. Allows for those with needs to define those needs.
5. Clarifies the responsibilities of each person and organization involved.
6. Matches service providers and service needs through a process that recognizes changing circumstance.
7. Expects genuine, active, and sustained organizational commitment.
8. Includes training, supervision, monitoring, support, recognition, and evaluation to meet service and learning goals.
9. Insures that the time commitment for service and learning is flexible, appropriate, and in the best interests of all involved.
10. Is committed to program participation by and with diverse populations. (Johnson Foundation, 1989)

Conceptual Framework of Service-learning's Impact on Students' Behavior: Schwartz's Model of Helping Behavior

When examining relationships between service-learning and students' helping behavior/attitude to help, it is important to have a good theoretical foundation of how helping behavior happens. Among several theoretical models of helping behavior, Schwartz's model is adopted in this study. The Schwartz's model consists of four steps/phases as depicted below (Schwartz, 1977).

- **Phase I. Activation Steps: Perception of a need to respond.**
  - *Awareness* that others are in need,
  - Perception that there are *actions* that could relieve the need,
  - Recognition of one's own ability to do something to provide help, and
  - A feeling of responsibility to become involved based on a sense of *connectedness* with the community or the people in need.

- **Phase II. Obligation Step: Moral obligation to respond.**
  - Feeling a moral obligation to help generated through (a) personal or situational *norms to help* and (b) *empathy*.

- **Phase III. Defense Steps: Reassessment of potential responses.**
  - Assessment of (a*) costs* and (b) probable outcomes (*benefits*) or helping.

- Reassessment and redefinition of the situation by denial of the reality and *seriousness* of the need and the responsibility to respond.

- **Phase IV. Response Step: Engagement in helping behavior.**
  - *Intention* to engage in community service or not

History of Service-learning in the U.S.

Although it would be difficult to trace the exact beginning of service-learning, most scholars accept John Dewey's (1859-1952) writing (1902) as the initial attempt to tying service and schooling. Dewey's concept of "associated living" preceded his writings about rebuilding connections between the school and community. In *Experience and Education* (1938/1963) and *Democracy and Education* (1916), Dewey provided crucial service-learning components such as working in a team rather than as isolated individuals, close relationships between learning and personal experience, stressing the importance of social growth, and the value of activities that benefit others. Dewey mentioned that experience alone is not adequate for meaningful learning (Dewey, 1986). Dewey believed education should be concerned with developing students' long-term commitment and ability to contribute to society. Effective learning experiences must 1) capture interest, 2) be intrinsically worthwhile, 3) present problems that generate curiosity and need for more knowledge, and 4) lead to development of learners over a sufficiently long period of time (Logan, 1997).

William Kilpatrick (1918), one of Dewey's disciples and a leader of the Progressive movement, strongly supported the "project method" as a curricular and pedagogical educational tool. Many schools in the Progressive movement adopted social reform, education outside the classroom, and education from real life problems (Kraft, 1996).

In the 1950s, the Citizenship Education Project (CEP) at Teacher's College set the framework for "active learning" which was followed by many state and national reports

on educational reform to enhance relevancy to the broader society in the 1970s. Whereas the publication of *A Nation at Risk* (National Commission on Excellence in Education, 1983) claimed to focus on the basics rather than "progressive" aspects in the 1970s. Campus Compact (1985) was created by college and university presidents to endorse the civic and public missions of higher education and to promote community engaged education in higher education. Hundreds of state and local boards of education and schools implemented service-learning programs or required volunteer services for graduation. Campus Compact provided its member institutions with help to engage students in community involvement, to develop service-learning curricula, and to implement institutional reform to support the institution's civic reform (Bringle et al., 2004).

In the 1990s, the Points of Light campaign, and the passage of the National and Community Service Act (1990) and National Service Trust Act of 1993 exemplified federal support to promote community engagement and service-learning. In 1995, the Health Professions Schools in Service to the Nation (HPSISN) was established by the Pew Health Professions Commission to uphold service-learning in health professional schools.

In summary, service-learning is a relatively recent phenomenon that is the result of almost 100 years of American history of educational reform efforts to connect schools and community, build social responsibility or a citizenship ethics, and create active forms of learning. Although there has been political support at the national and state level, most of service-learning programs were developed by individual teachers.

Service-learning Internationally

In the United Kingdom, the Council for Citizenship and Learning in the Community (CSV/CCLC) has been promoting and facilitating education for citizenship and service learning in higher education by working in partnership with over 200

programs. Their goal is to promote service learning through university/community partnerships while developing students' skills and citizenship, as well as meeting community needs. In 2002 the British government established the new "Higher Education Active Community Fund," which has provided funding for the establishment of community service programs based on effective community partnerships in all English universities. Not long after service-learning became prevalent in the U.S. and the U.K., service-learning in higher education were found in the Philippines, Singapore, Mexico, Brazil, Japan, and in Eastern and Central Europe (Annette, 2002).

In the U.S. and U.K. the number of service-learning study abroad programs is growing. For most of these programs, a group of students and a professor travel abroad and engage in a service learning project. Socially responsible international educational NGO (non-government organizations) enlists medical and educational volunteer teams for the provision of services to under-served populations in Central and South America, Mexico, the Caribbean, and Africa providing a service-oriented academic experience for 1,200 participants, from 225 colleges and universities (http://www.islonline.org/about/).

Service-learning in the U.S.

Although service-learning in the US is an accepted pedagogy, it still remains at the margins of curriculum at most universities and colleges.

In 1984, community service and service-learning activities were available in a slightly more than a quarter of all high schools in the U.S., were available primarily to white students, and actual service-learning credit-bearing courses occurred in only about 10% of all high schools. Most students were involved in service activities that required a total commitment of 2 hours or less per semester. Although the amount of service learning activities were modest at this time, the trend in developing course-related service learning was *declined* during the late 1980s and early 1990s. However, by 1997, the

number of high school students who were involved in service related programs increased dramatically; specifically, a 686 percent increase. The number of high school students involved in service-learning has increased more dramatically in recent years, estimated to have increased by 3663 percent by 1997. Among colleges and universities, almost 30% of students report participating in a course where service is part of the curriculum (Shumer & Cook, 1999).

Service-learning in Higher Education

American Association for Higher Education (AAHE), in partnership with the Corporation for National and Community Service, has commissioned volumes by leading academic leaders to examine the importance of service-learning in higher education and promote research on pedagogic practices that goes beyond anecdotal evidence and focuses on the evaluation of the learning outcomes of service learning (Annette, 2002).

Service-learning is found to be a powerful educational tool when working with youth, especially at-risk adolescents. Seventy-five percent of students who participated in service-learning courses reported that these classes were more interesting than other classes (Nelson, 2008). Sixty-four percent of students reported that service-learning could have a major positive impact on the dropout rate, and 83% of principals surveyed reported that service-learning has a positive impact on students' academic achievement (Nelson, 2008).

There is ample evidence that service-learning enhances students' academic performance, civic engagement, and development from personal, social, and professional perspectives (Astin & Sax, 1998; Driscoll et al, 1996; Eyler & Giles, 1999). Eyler and others summarized findings of service-learning research in higher education from 1993-2000, including the effects of service-learning, the effect of program design on students, the impact on faculty and universities and the impact on related communities. Several studies have shown that service-learning positively effects students' personal

development, interpersonal and leadership skills, and communication skills. Service-learning also has a positive effect on students' sense of social responsibility and commitment to service (Eyler, 2001).

Service-learning has dramatically increased its impact on the American educational scene during the past few years. New practitioners are adopting the methods of integrating traditional classroom based instruction with community service (Cone & Harris, 1996). Research indicates that involvement in service-learning programs contributes to closing the achievement gap between students from low socio-economic backgrounds and those from more advantaged backgrounds. Service-learning in undergraduate education has been shown to increase students' understanding of relevance of course content, change the attitudes of students and faculty, and increase volunteerism (Seifer, 1998).

Service-learning in the Medical Field

There has been a shift in health care industry in the United States to a market economy. There are an increasing number of service facilities in community-based settings, as opposed to traditional health-care settings. Health professional programs are beginning to include training in community health centers more and more to introduce students to new venues and a wider range of patients. In nursing, service-learning coupled with community-based education has been shown to be an effective way for educators to prepare nurses for their roles in healthcare (Cauley, 2001).

Evaluation of integrating a service-learning into a preexisting course at the University of Kentucky, College of Medicine determined that "providing opportunities for medical schools and community agencies to sponsor joint projects that allow students to link community service with formal medical coursework adds value to their education experience while fostering a professional commitment to the community" (Elam, 2003).

Service-learning in the medical field enables students to understand the multifactorial nature of quality of life and health. Partnering with a community allows better understanding of the community's needs, as well as assets. Service-learning in medical education has a promise as a curricular strategy for students' understanding of their roles as health professionals and responsible citizens (Seifer, 1998).

Service-learning in Dental Education

Service-learning was introduced to dental school curriculum in order to meet the profession's obligation to meet the public's oral healthcare needs. It is intended to help students "internalize" their role as a healthcare provider in the context of a community and bring community engagement and educational objectives together. Movement has begun to institutionalize service-learning in all higher education, including the dental field (Bailit et al. 2008, 98-109). For example, in 2001, The Pipeline, Profession, & Practice: Community-Based Dental Education program was initiated from funds from the Robert Wood Johnson Foundation with a goal to help increase access to oral care to the underserved. Dental schools with the Pipeline program were required to use the funds to establish community-based clinical education programs and integrate community-based education into the curriculum (Formicola, 2009). Fifteen dental schools which received the Pipeline funds increased the average number of days senior dental students spend in community clinics from 10 to 50 days between 2001 and 2009 (Formicola, 2009) and all schools reported an increase in community-based education (Atchison, 2009).

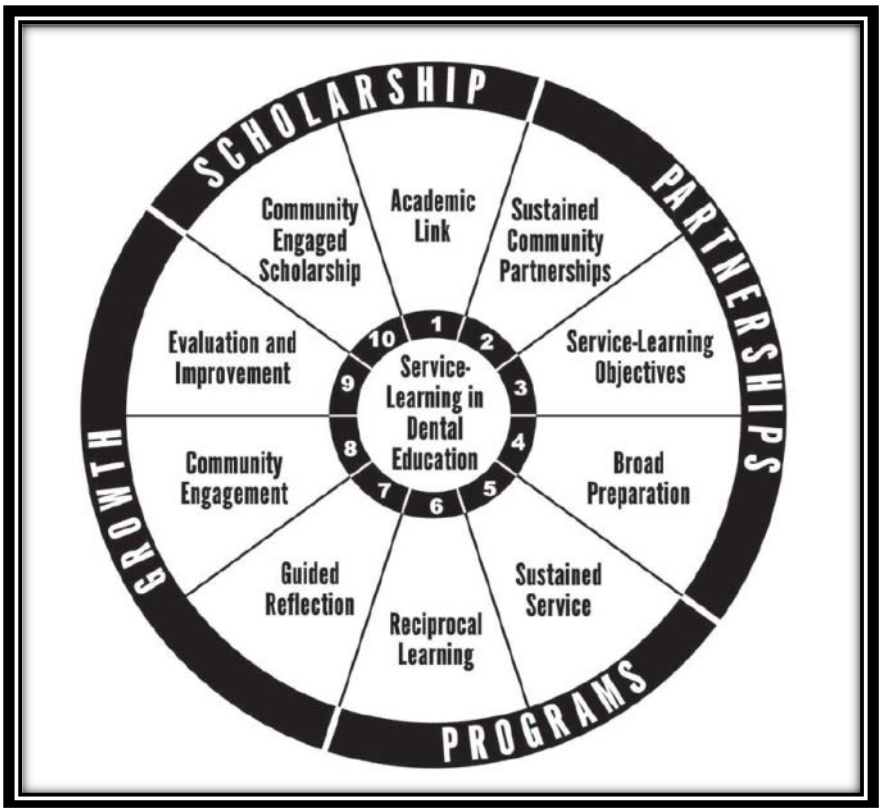
Community-based education including service-learning has increasingly focused to prepare students to work in the "real world" (Henshaw et al., 1999). Still, significant areas that need improvement in dental education include better communication with key stakeholders of oral healthcare and the community, graduating more socially aware, culturally competent, and community-oriented dental professionals, and a devoted community partner to increase access to all citizens (Davis, 2007). Service-learning can

address areas as such critical thinking, professionalism, communication, health promotion and disease prevention, practice management and informatics, and patient care which are included in the ADEA (American Dental Education Association) Competencies for the New General Dentist as well as CODA Standards (Hood, 2009).

Community-based dental education prepares students in cultural awareness, communication skills, and the behavioral sciences. Potentially it can affect dental students' values and behaviors related to caring for the underserved (Strauss, 2010). The belief is that community-based dental education will positively affect values and behaviors of future dentists in terms of treating the underserved population and giving back to an at-need community. Yoder stated that service-learning will create "a deeper understanding of the dynamics, the assets, and the challenges of the community and its relationship to oral and general health" (Yoder, 2006).

Figure 2 depicts a framework for service-learning in dental education that provides a good foundation for planning, implementing, and evaluating service-learning. Yoder suggested that the ten components in the framework should be present in order to classify a certain community engagement program as service-learning in dental education. Dental educators and researchers can use this framework and its components to differentiate service-learning from other community engagement activities.

Figure 2: Framework for Service-learning in Dental Education



(Source: Yoder, K. M. 2006. A framework for service-learning in dental education. *Journal of Dental Education* 70 (2): 115.)

Davis and others surveyed leaders at university and state levels asking about perceptions of roles and responsibilities of dental education in serving the public good and the extent to which they are being met. The authors found that dental education was perceived as fulfilling its public purpose in promoting oral health, providing access to care, and conducting relevant research. Areas needing improvement included better

communication of dental education's accomplishments to key stakeholders, graduating a more socially aware, culturally sensitive, and community-oriented dental practitioner, and dental education being a committed partner with other community leaders in improving access to care for all citizens. The author recommended use of community-based and service-learning programs in dental schools, starting early in the educational process (Davis, 2007).

A survey of North American dental school curricula from 2005 found that the majority of dental schools incorporated some type of community-based rotation. However, most of these programs focused on education of the students in terms of clinical experience, with little or no emphasis on engagement of the community being served (Kassebaum, 2004). For example, University of Colorado Denver School of Dental Medicine is one of the schools that have 100 days of community rotations as part of the dental school curriculum. They have operated a community-based dental education program since 1985 and reported that between 1994 and 2006 dental students gained considerable amount of clinical experience in periodontics, removable prosthodontics, and endodontics (Berg, 2010). The report did not specifically mention how students were engaged in the community being served.

In the following section, service-learning at VCU School of Dentistry will be described first then evaluation of the impact of service-learning or like kind activities in other dental schools will be presented.

Service-learning at VCU School of Dentistry

The VCU School of Dentistry (SoD)'s service-learning program has been developed from the preceptorship program which began in 2003-2004. The preceptorship program grew out of a 1999 study by the Virginia Legislature's Joint Commission on Health Care, which found that lack of access to dental care was a major problem for many Virginians. They recommended that VCU SoD create a dental preceptorship

program for dental and dental hygiene students at various community-based sites. The three goals were: 1) to increase the provision of needed dental care services to underserved groups, 2) to increase the experience of dental and dental hygiene students in working with underserved groups while increasing the students' understanding of the groups' needs, and 3) to expose future dentists and dental hygienists to the benefits of future practice in underserved areas of Virginia. Initially, the preceptor program was implemented at two community sites: Northern Neck Free Health Clinic in Kilmarnock and the Free Clinic of Central Virginia in Lynchburg. Thirty percent of senior dental students participated in the preceptorship program in 2003-2004. Since its inception, the service-learning program at VCU SoD has experienced growth in terms of participation of students and community partners. In 2005-06, dental and dental hygiene students provided over 400,000 procedures to underserved patients at community sites. In the academic year of 2011-2012, a total of twelve community partners have participated in the service-learning program for dental and dental hygiene students (Isringhausen, K. (course director DENS 762),).

In 2011 the service-learning program (DENS 762: Clinical Service-Learning) became a university-designated service-learning course and it is now required for all senior dental students. To earn the university designation, the course had to meet specific exemplary service-learning practices. In the DENS 762 course, dental students are assigned to rotate through a set of twelve different external sites and help meet the community needs. Figure 3 shows distribution of those twelve sites. They are scattered throughout the state of Virginia including rural areas and mainly community health clinics where patients of all ages are being treated. In its selection of community partners, the VCU SoD strives to cultivate partnerships with clinics that are diverse in types of community-based settings and populations served. Standardized and strict selection criteria and protocols are used for selection of community-based clinical training sites and also for the selection of preceptors for students to ensure maximizing benefits to both

students and community. Site selection is based foremost on the educational value of the expected experience and may include opportunity to work with special populations, including the socially and culturally disadvantaged, and to practice in alternative and non-traditional settings (Personal communication with the course director of DENS 762, 2012).

Because DENS 762 became a required course, student placement in community sites is now 100 percent. Fourth year dental students now spend an average of 25 days working in public clinics throughout the Commonwealth of Virginia. Students' service-learning is assessed and reinforced by self-reflection on their experiences. Each student participating in community-based activities is required to submit journal writings (two required for the course) within one week of completing service-learning assignments. Journal writing is used to facilitate reflection, critical thinking, and expression of feeling regarding community-based experiences all of which are critical components of service-learning as described earlier. The reflective journal entries help students to focus and summarize their observations and activities. Students are encouraged to focus on lessons learned, accomplishments, conflicts, concerns and questions that are not resolved in the real world. Three forms of reflective evaluation are available for students to choose from: (1) guided reflection, (2) critical incident journal, and (3) photographic documentation with written narrative reflection. In addition to reflection, students are also required to blog about community experiences through Blackboard: web-based course management software. Each student must blog at least one time but is encouraged to blog as much as they wish. Student self-evaluation occurs through digital story telling where students can use pictures and narratives to tell a story related to their rotations. Lastly, site evaluation is completed by each student for all assigned external rotations. Each community partner also completes an evaluation of each student and forwarded to the course director (Standardized Syllabus of DENS 762, 2012).

Figure 3 shows geographic distribution of twelve community partners for dental students' service-learning. All twelve sites are listed in the following.

- American Red Cross of Southeast Virginia (Norfolk, VA)
- Boydton Dental Center (Boydton, VA)
- Bradley Free Clinic (Roanoke, VA)
- Chesapeake Care Clinic (Chesapeake, VA)
- Community Dental Clinic (Martinsville, VA)
- Cross Over Ministries Dental Clinic (Richmond, VA)
- Daily Planet (Richmond, VA)
- PATHS Community Dental Center (Danville, VA)
- Goochland Free Clinic and Family Services (Goochland, VA)
- Hanover Interfaith Free Clinic at Mechanicsville Christian Center (Mechanicsville, VA)
- Northern Neck Free Health Clinic (Kilmarnock, VA)
- Southwest Virginia Regional Dental Center (Saltville, VA)

Figure 3: State of Virginia and Geographic Distribution of Service-learning Community Partners

Evaluation of Service-learning in Dentistry

Reasons to Evaluate

Effective evaluation of service-learning program allows for better understanding of the impact of the program to various stakeholders including students, course instructors, school administrators, community partners, accreditation bodies, local and state boards of public health, and allows a determination of what is effective and where there is room for improvement. Also, evaluations can be used to secure continued funding for the program when the funding agency requires a formal evaluation as a form of performance demonstration. To be able to evaluate a service-learning program, it is important to write the course objectives in a quantifiable format (Yoder, 2006).

According to Henshaw, reasons to evaluate service-learning program are:

- To assess the impact of the program

- To improve program operations or increase efficiency
- To identify if the program needs to take new directions
- To obtain accreditation
- To justify program continuation or resource allocation
- To meet an imposed requirement from funder or other stakeholder
- To obtain data that can be used for public relations
- To fully describe the programs so it can be replicated
- To identify faculty, students, or partners that have excelled
- To provide an opportunity for faculty scholarship (Henshaw, 2008)

An internal evaluation of University of North Carolina dental students views before and after experiences with Community-Based Dental Education (CBDE) over a two-year period found that thirty-eight percent said CBDE changed their idea of where they would practice dentistry; twenty-four percent said that it increased their interest in working in a rural setting; and 56 percent said that CBDE experiences increased their interest in treating underserved patients. The authors concluded that CBDE has potential to affect the values and behaviors for dental students relative to health care access for underserved populations and for attracting a more diverse array of students to dental education (Strauss, 2010).

On the other hand, an evaluation of the Pipeline, Profession, & Practice program (the program was described in the earlier section of this chapter) conducted between 2003 and 2008 found that although practice plans of senior dental students for community-based work were overall unchanged by the program, students' perceptions of the adequacy of their preparation for extramural rotations were positively associated with their plans to provide care to at least 25 percent of underserved patients (Atchison, 2009).

Service-learning has the potential to benefit not only students, but also faculty, academic institutions, community organization and community members and it also holds promise as a curricular strategy for preparing students for their roles as health care professionals.

Literature regarding Service-learning and Dental Students' Attitude

Currently available literature regarding service-learning and dental students' attitude can be categorized in two groups. One group includes studies that examined relationships between student characteristics and students' attitude to community service/willingness to treat the underserved. The other group includes studies that examined the impact of community-based dental education on students' attitude/willingness to treat the underserved. Several representative studies are described in detail, below.

Dental Education and Intention to Care for the Underserved: University of Michigan

Smith et al. explored impact of dental education on dental students' attitudes and intentions to treat underserved patients in their future professional lives and on practicing dentists' attitudes and actual behavior concerning treating underserved patients. They collected data on 328 dental students (response rate: 77.5 percent) and 234 alumni (response rate: 43.7 percent). The authors measured correlations between student and alumni evaluations of their dental education and their professional attitudes and correlations between student and alumni perceptions of their dental education and their professional behavior/behavioral intentions to treat underserved patient groups. Positive relationships were found in the study. The more students perceived that their education prepared them to see ethnically diverse group of patients, the more receptive students were to see patients from those ethnic groups ($r=0.12$, $p=0.009$). The survey was conducted for all dental students in 2004 but no statistical analysis was reported regarding differences among dental classes. Similarly, the more alumni perceived that they received adequate education to treat all ethnic groups during dental school, the more likely the alumni reported that they would treat those ethnic groups ($r=0.18$, $p=0.009$)

(for graduating classes of 1980,1985,1990,1995, and 2000). Surprisingly only 46.8 percent of students reported that they plan to treat patients with disabilities and only half of the students reported that they plan to treat the underserved. However, students' responses regarding dentists' social responsibilities were more positive than alumni responses. The authors concluded that the level of preparedness (at least perceived preparedness) during dental school affects not only providers' attitude for caring for the underserved but also their actual intention and behavior to treat the underserved. The authors suggested that access to oral health care for underserved patients could potentially be increased if dental students were more overtly educated about the importance of treating patients from all segments of society (Smith et al., 2006).

Community-based Clinical Experiences and Willingness to Treat Vulnerable Population Segments: University of Iowa

Kuthy et al. analyzed students' perceptions of comfort and anticipated willingness to treat selected special needs and underserved populations upon completion of community-based clinical experiences at the University of Iowa. All senior dental students at the University of Iowa are required to rotate to two different community-based sites for two five-week rotations for a total of ten weeks. The community-based programs that are available for students to choose from included in-house Special Care Program where students see medically, physically, or mentally challenged patients and the Geriatric Mobile Unit where they see long-term care facility residents, a county public hospital: Broadlawns Medical Center, a county public hospital in Des Moines, Iowa, as well as several community health clinics in Iowa and Colorado, a Veterans Affairs hospital, and Indian Health Service sites. Upon completion of the ten-week rotations, students were invited to an exit seminar to share their experiences and reflections and are asked to complete a survey. The authors surveyed 852 students and compiled all survey responses from graduating classes from 1992 to 2004 that resulted in

726 respondents (85.2 percent). The survey instrument included student characteristics (predictor variable) and students' comfort and future willingness to treat twelve vulnerable population groups (outcome variable). Comfort level was measured on a five-point scale: 5=no problem, 1=will not treat; willingness to treat was measured dichotomously: yes or no. Population groups that were identified as traditionally vulnerable groups included low-income, frail elderly, homebound, medically complex, mentally compromised, homeless, drug user, other ethnic groups, Medicaid patients, HIV+ patients, jail inmates, and non-English speaking patients. The authors concluded that students' prior experience is most often associated with comfort in treating the associated population group. After adjusting other predictor variable, students' program assignments impacted their comfort level with treating frail elderly, medically complex, and non-English speaking patients. Level of exposure influences comfort level that leads to willingness to treat the vulnerable populations. Interestingly, only certain student characteristics were related to comfort or willingness to treat. Student gender, graduation year from dental school, and community assignments influence only a few of these targeted population groups (Kuthy, Heller, Riniker, McQuistan, & Qian, 2007).

Community-based Dental Education and Practice Plans of Graduating Seniors: ADEA Survey of Dental School Seniors

Davidson et al. analyzed senior dental students' plans to provide care to underserved racial/ethnic minority populations based on the ADEA Survey of Dental School Seniors and administrative data. Variables included social and demographic characteristics, educational financing, indebtedness, adequacy of time in pre-doctoral instruction, and contextual variables (predictor variables), and practice plans (outcome variable). Contextual environmental variables included the number of federally qualified health centers in the respective state, the percentage of underrepresented minorities, and

the respective dental school being a California Pipeline school: the authors categorized responding dental schools as national Pipeline schools (schools that were awarded funds from Robert Wood Johnson Foundation) (n=10), California Pipeline schools (schools that were awarded funds from California Pipeline Endowment funds) (n=5), and non-Pipeline schools (n=38) (P. L. Davidson et al., 2007). The authors concluded that student characteristics, community-based dental education experiences, and contextual environmental factors significantly predicted plans to care for underserved populations upon graduation. Significant student characteristics were being members of racial/ethnic minorities, female gender, older age, lower parent's income, and socially conscious orientation. The authors suggested if the Pipeline, Profession, & Practice initiative (details about this program was described in the earlier section of this chapter) is successful in stimulating reform in U.S. dental schools in terms of engaging more in community-based dental education, future students will develop greater awareness regarding critical access problems and the competencies required to effectively care for diverse populations (P. L. Davidson et al., 2007).

Non-dental Community Program and Cultural Competence: University of Pittsburgh

Rubin et al. assessed changes in dental students' cultural competence after participation in a two-year program of non-dental community service (Student Community Outreach Program and Education: SCOPE) and measured changes in cultural competence using a twenty-eight item survey at the University of Pittsburg during 2003-2007. First, they measured it upon completion of the SCOPE program. Second, they measured pre-SCOPE cultural competence using retrospective pre-test: asking respondents to recall what the responses were before the SCOPE program. (More discussions of retrospective pre-test will follow in Chapter III: Methods) SCOPE is mandatory for all dental students at the University of Pittsburgh. Students are required to

perform forty hours of non-dental public-health related services in community settings. Three hundred sixty two students were invited to the survey and one hundred twenty-six pre and post-test surveys were matched for analysis. In each of the twenty-eight items, students were asked to rate their agreement on a scale from 1: strongly disagree to 5: strongly agree. Factor analysis identified four scales: 1) community service, 2) cultural competence, 3) communication, and 4) treatment perspective. The first three scales showed statistically significant differences ($p<0.05$) between pre and post-test: p-values were 0.017, 0.001, and 0.057 for the scales of community service, cultural competence, and communication, respectively while the scale of treatment perspective did not show a significant p-value. The authors found that participation in the community service program resulted in an improvement in student cultural competence and an increase in students' sense of social responsibility, regardless of the level of cultural competence exhibited upon entry into the program (Rubin, 2008).

Community-based Oral Health Promotion and Prevention Program for First Year Dental Students and Attitude to Caring for the Underserved: University of Southern California

Holtzman et al. assessed impact of community-based oral health experiences on dental students' (D1) attitudes toward caring for the underserved and measured student characteristics (predictor variable) and attitudes to caring for the underserved (outcome variable) populations at the University of Southern California School of Dentistry. As part of the community oral health promotion programs that have targeted individuals in underserved communities since 2003, freshman dental students provide in-class oral health promotion sessions (four forty-five-minute sessions) and preventive programs to elementary school children for two half-days. This is required for all freshman dental students and the students are asked to write reflections on one critical event. The authors

surveyed 144 freshman dental students before/during/after the program and measured students' attitudes about societal expectations, health professionals' responsibility, access to care, and students' personal efficacy to positively impact the need for expanded oral health services for the underserved. The measuring instrument the authors used was based on statements in the attitudes toward health care survey instrument that was originally designed for medical students by Crandall and others. However, no statistical analysis was conducted to test validity and/or reliability of this survey instrument. Students' attitude to the underserved was positive throughout the study period. Students' attitudes about societal expectations to care for the underserved remained stable and were not positively affected by the community oral health promotion program. At the end of the program, students still thought dentists had societal expectations to provide at least some free care to those in need but they became uncertain about who should be responsible for the care, which suggested that students understood that providing care to those in need is a complex problem. Students' characteristics such as age, gender, community volunteer work, areas where the student grew up, and debt were not associated with students' attitude to caring for the underserved (Holtzman & Seirawan, 2009).

An Integrated Dental Service-Learning Clinical Program's Impact on Dental Students: A.T. Still University

A.T. Still University's Arizona School of Dentistry & Oral Health (ASDOH) has implemented a twenty-three week per year external clinical rotation program (ASDOH Integrated Community Service Partnership Program (ICSP)) and results of the program's influence on student perceptions were presented in ADEA Annual Session of 2010. The goals of the ICSP included providing an opportunity to become familiar with diverse populations, outside communities, clinical operations, and delivery systems in the community in the underserved settings. The rotations were done in approximately sixty

sites in over twenty-five states across the nation in both urban and rural locations in a variety of settings: nonprofit and/or government organizations, community health centers, Veterans Affairs hospitals, county/city/tribal health care centers, jails/prisons, and Indian Health Service sites.

After the completion of the ICSP external clinical experiences, 89 percent of the students in the study cohort (N=51) participated in a two-hour small-group interview that was recorded. The self-perceived advantages included more clinical experience with culturally diverse, medically complex, and pediatric patients; experience dealing with reimbursement and insurance; working in a team with the staff and assistants; confidence in clinical decisions; and increase in efficiency (2010 ADEA annual session: Poster abstracts.2010)(adopted from 2010 ADEA Annual Session: Poster Abstracts, submitted by M.L. Gross-Panico and others).

Gaps in the literature

Currently, there is limited knowledge available regarding the effect of service-learning on dental students' attitude toward community service. Previous studies have limitations in the following aspects: They were of cross-sectional study design when they intended to measure "change" or "impact." To measure change or impact, the study design should be based on two subsequent data collection points to measure pre-test and post-test. Some studies claimed that their educational program made a large difference, but theoretically, there was no way to demonstrate the educational program's influence when the outcome variable was measured only once. Secondly, for some studies, the community based educational program was too short to reasonably speculate about the relationship between the program and changes in dental students' attitude. For example, in Holtzman's study the educational program duration was only a little over one day which made it difficult to speculate how students may have changed their attitude during such a short period of experience. Thirdly, some studies were not based on a conceptual

framework for community service attitude to predict behavior and validated attitude constructs. Attitude has been believed to be antecedent to behavior, but it has multiple underlying components. Combining validated constructs to measure attitude is important in studying attitude as a predictor of behavior.

Service-learning Research Scales

Community Service Attitudes Scale (CSAS)

The CSAS is designed to measure college students' attitude to community service based on Schwartz's model of helping behavior (Schwartz's model is presented before) and is adopted in this project. This survey has 46 items assessing community service attitudes in eight subscales: *awareness, connectedness, norms, empathy, costs, benefits, seriousness,* and *intention to community service.* These eight subscales are derived from factor analysis. Reliability in terms of temporal consistency and internal consistency and validity were found to be high. Principal component analysis assessed whether linear combinations of the community service attitudes are consistent with Schwartz model. The eight factors had eigenvalues higher than 1 and communalities ranged from 0.54 to 0.79 (average = 0.68). Internal consistency was assessed through coefficient alphas, scale means, and standard deviations, and correlations of the factor scales. Alpha reliabilities ranged from 0.84 to 0.93 for all factors except two items in Benefits factor. Shiarella and others' study showed that Schwartz model of helping behavior integrates various aspects of comprehensive theory of community service and can be a useful tool for researchers and educators. The eight subscales with corresponding questions are below (Shiarella, 2000).

Awareness

- Community groups need our help.
- There are people in the community who need help.

- When I meet people who are having a difficult time, I wonder how I would feel if I were in their shoes.
- I feel bad that some community members are suffering from a lack of resources.
- I feel bad about the disparity among community members.
- There are needs in the community.
- There are people who have needs which are not being met.

Connectedness

- I am responsible for doing something about improving the community.
- It is my responsibility to take some real measures to help others in need.
- It is important to provide a useful service to the community through community service.
- It is important to me to have a sense of contribution and helpfulness through participating in community service.
- It is important to me to gain an increased sense of responsibility from participating in community service.
- I feel an obligation to contribute to the community.
- Other people deserve my help.
- It is critical that citizens become involved in helping their communities.

Normative helping behavior

- It is important to help people in general.
- Improving communities is important to maintaining a quality society.
- I can make a difference in the community.
- Our community needs good volunteers.
- All communities need good volunteers.
- Volunteer work at community agencies helps solve social problems.
- Volunteers in community agencies make a difference, if only a small difference.
- College student volunteers can help improve the local community.
- Volunteering in community projects can greatly enhance the community's resources.
- Contributing my skills will make the community a better place.
- My contribution to the community will make a real difference.

Costs

- I would have less time for my schoolwork.
- I would have forgone the opportunity to make money in a paid position.
- I would have less energy.
- I would have less time to work.
- I would have less free time.
- I would have less time to spend with my family.

Benefits

- I would be contributing to the betterment of the community.
- I would experience personal satisfaction knowing that I am helping others.
- I would be meeting other people who enjoy community service.
- I would be developing new skills.

Career Benefits

- I would make valuable contacts for my professional career.
- I would gain valuable experience for my resume.

Seriousness

- Lack of participation in community service will cause severe damage to our society.
- Without community service, today's disadvantaged citizens have no hope.
- Community service is necessary to making our communities better.
- Community service is a crucial component of the solution to community problems.
- The more people who help, the better things will get.

Intention

- I want to do this activity.
- I will participate in a community service project in the next year.
- Would you seek out an opportunity to do community service in the next year?

CHAPTER III

METHODS

Introduction

This study had two specific purposes/aims. First, this study's purpose was to measure service-learning's impact on dental students' attitude to community service at VCU School of Dentistry (SoD) for the academic year of 2011-2012. Secondly, this study was aimed to assess the relationship between student characteristics and their attitude to community service at VCU SoD for the academic year of 2011-2012.

This chapter starts with a specific set of research questions and hypotheses to fulfill two purposes as above mentioned. Then description of the study population and variables will follow. Those variables were used in the questionnaires for pre-test and post-test for which more details were presented in the remainder of this chapter. Finally analysis plan and hypothesis testing were explained in details.

Research Questions

- What was the service-learning program's (DENS 762) impact on dental students' attitude (*awareness*) to community service at VCU SoD in 2011-12?
- What was the service-learning program's (DENS 762) impact on dental students' attitude (*connectedness*) to community service at VCU SoD in 2011-12?
- What was the service-learning program's (DENS 762) impact on dental students' attitude (*normative helping behavior*) to community service at VCU SoD in 2011-12?
- What was the service-learning program's (DENS 762) impact on dental students' attitude (*costs*) to community service at VCU SoD in 2011-12?
- What was the service-learning program's (DENS 762) impact on dental students' attitude (*benefits*) to community service at VCU SoD in 2011-12?

- What was the service-learning program's (DENS 762) impact on dental students' attitude (*career benefits*) to community service at VCU SoD in 2011-12?
- What was the service-learning program's (DENS 762) impact on dental students' attitude (*seriousness*) to community service at VCU SoD in 2011-12?
- What was the service-learning program's (DENS 762) impact on dental students' attitude (*intentions to community service*) to community service at VCU SoD in 2011-12?
- What was the relationship between student characteristics and dental students' attitude (*awareness*) to community service at VCU SoD in 2011-12?
- What was the relationship between student characteristics and dental students' attitude (*connectedness*) to community service at VCU SoD in 2011-12?
- What was the relationship between student characteristics and dental students' attitude (*normative helping behavior*) to community service at VCU SoD in 2011-12?
- What was the relationship between student characteristics and dental students' attitude (*costs*) to community service at VCU SoD in 2011-12?
- What was the relationship between student characteristics and dental students' attitude (*benefits*) to community service at VCU SoD in 2011-12?
- What was the relationship between student characteristics and dental students' attitude (*career benefits*) to community service at VCU SoD in 2011-12?
- What was the relationship between student characteristics and dental students' attitude (*seriousness*) to community service at VCU SoD in 2011-12?
- What was the relationship between student characteristics and dental students' attitude (*intention to community services*) to community service at VCU SoD in 2011-12?

Hypotheses (H0)

- The service-learning program (DENS 762) has impacted dental students' attitude (*awareness*) to community service at VCU SoD in 2011-12.
- The service-learning program (DENS 762) has impacted dental students' attitude (*connectedness*) to community service at VCU SoD in 2011-12.
- The service-learning program (DENS 762) has impacted dental students' attitude (*normative helping behavior*) to community service at VCU SoD in 2011-12.
- The service-learning program (DENS 762) has impacted dental students' attitude (*costs*) to community service at VCU SoD in 2011-12.
- The service-learning program (DENS 762) has impacted dental students' attitude (*benefits*) to community service at VCU SoD in 2011-12.
- The service-learning program (DENS 762) has impacted dental students' attitude (*career benefits*) to community service at VCU SoD in 2011-12.
- The service-learning program (DENS 762) has impacted dental students' attitude (*seriousness*) to community service at VCU SoD in 2011-12.
- The service-learning program (DENS 762) has impacted dental students' attitude (*intention to community service*) to community service at VCU SoD in 2011-12.
- There is a relationship between student characteristics and dental students' attitude (*awareness*) to community service at VCU SoD in 2011-12.
- There is a relationship between student characteristics and dental students' attitude (*connectedness*) to community service at VCU SoD in 2011-12.
- There is a relationship between student characteristics and dental students' attitude (*normative helping behavior*) to community service at VCU SoD in 2011-12.
- There is a relationship between student characteristics and dental students' attitude (*costs*) to community service at VCU SoD in 2011-12.

- There is a relationship between student characteristics and dental students' attitude (*benefits*) to community service at VCU SoD in 2011-12.
- There is a relationship between student characteristics and dental students' attitude (*career benefits*) to community service at VCU SoD in 2011-12.
- There is a relationship between student characteristics and dental students' attitude (*seriousness*) to community service at VCU SoD in 2011-12.
- There is a relationship between student characteristics and dental students' attitude (*intention to community service*) to community service at VCU SoD in 2011-12.

Study Population

This study's population was VCU SoD senior dental students (class of 2012) who were enrolled in the clinical service-learning class (DENS 762) in the academic year of 2011-12. The total class size was 105 including five students in the International Dentists Program. The International Program students joined the class of 2012 in their junior year and were to be self-identified by question 59 in Survey 1. According to VCU SoD profile of class of 2012 in 2008, the class of 2012 represented eighteen states and three countries. Fifty-six of the students were Virginia residents. The age ranged 24-36 and there were 66 male students and 39 female students.

Variables and Operational Definitions

- Service-learning was defined as being enrolled in the DENS762: clinical service learning class at VCU School of Dentistry
- Awareness is a measure of survey respondent's perceived awareness to community needs based on responses of a predetermined set of multiple questions (Q. 14, 19, 31, 33, 34, 36, 44) in the Survey 1 and Survey 2. This measure was adopted from the Community Service Attitudes Scale (CSAS).

- Connectedness is a measure of survey respondent's perceived connectedness to his or her community based on responses of a predetermined set of multiple questions (Q. 25, 27, 28, 29, 30, 35, 39, 41) in the Survey 1 and Survey 2. This measure was adopted from the CSAS.
- Normative helping behavior is a measure of survey respondent's perceived personal or situational moral obligation to help his or her community and based on responses of a predetermined set of multiple questions (Q. 15,16,17,18,20,21,22,23,24,26,45) in the Survey 1 and Survey 2. This measure was adopted from the CSAS.
- Costs is a measure of survey respondent's perceived costs in exchange of helping his or her community and based on responses of a predetermined set of multiple questions (Q. 7,8,9,10,11,12) in the Survey 1 and Survey 2. This measure was adopted from the CSAS.
- Benefits is a measure of survey respondent's perceived benefits in exchange of helping his or her community and based on responses of a predetermined set of multiple questions (Q. 1,2,3,4) in the Survey 1 and Survey 2. This measure was adopted from the CSAS.
- Career benefits is a measure of survey respondent's perceived benefits related to his or her career in exchange of helping his or her community and based on responses of a predetermined set of multiple questions (Q. 5,6) in the Survey 1 and Survey 2. This measure was adopted from the CSAS.
- Seriousness is a measure of survey respondent's seriousness to help his or her community after considering costs and benefits and based on responses of a predetermined set of multiple questions (Q. 37, 38, 40, 42, 43) in the Survey 1 and Survey 2. This measure was adopted from the CSAS.
- Intentions to community service is a measure of survey respondent's intention to help his or her community and based on responses of a predetermined set of

multiple questions (Q. 13,32,46) in the Survey 1 and Survey 2. This measure was adopted from the CSAS.

- Attitude to community service is a measure of survey respondent's overall attitude to help his or her community's needs based on the eight scales described above and based on the questions in the Survey 1 and Survey 2. This measure was adopted from the CSAS.
- Gender: selection of male or female as reported by survey respondent
- Age: self-reported age in years
- Ethnicity: self-identified race/ethnicity as a choice of 1) white, 2) black, African American, 3) Hispanic, Latino, or Spanish origin, 4) American Indian or Alaska Native, and 5) Asian or Pacific Islander. The choices given are modified from United States Census categorization of ethnicity.
- Prior volunteer experience: self-reported volunteer experience prior to dental school with a choice of 1) yes, regularly, 2) yes, occasionally, and 3) no.
- Volunteer activity outside dental school curriculum: self-reported volunteer activity outside dental school curriculum with a choice of 1) yes, regularly, 2) yes, occasionally, and 3) no.

Research Design

This study was an observational and descriptive study of the VCU SoD class of 2012 who were enrolled in Clinical Service-learning: DENS 762 in the academic year 2011-12. The questionnaire was web-based sixty-question survey. Two parallel questionnaires were developed for the pre-test and retrospective post-test. As more details will be described in a subsequent section, the questionnaires were pre-tested to increase their validity. This study was approved by the VCU Office of Research Subjects Protection on Mar. 2, 2012 for being qualified for exemption from the full board review. University of Iowa Institutional Review Board (IRB) was also contacted regarding the

need to apply for the review. The University of Iowa IRB confirmed that an IRB review at the site where the study was conducted was sufficient and it was not necessary to apply for their IRB (email and phone communication with University of Iowa College of Dentistry IRB coordinator, December 2011). Thus no application to University of Iowa IRB was pursued.

The data collection phase took place during the months of March and April 2012. The first online invitation from the course director: Ms. Kim Isringhausen to participate in Survey 1(post-test) was sent on March 19, 2012 immediately following all students completing their assigned rotations in Clinical Service-learning class on March 9, 2012. March 19 was the first available day since the Spring Break was from March 10 to March 18. Two follow-up emails were sent only to non-respondents to remind them of the study. An invitation to Survey 2 (retrospective pre-test) from the principal investigator only to respondents of Survey 1 was sent on April 6, 2012 followed by two reminders to non-respondents in the following weeks. REDCap software was used for all these invitations and data collection to ensure data security. REDCap generated ID codes that were used to match pre-test and post-test data for the same subject. The project statistician, Dr. Al Best, oversaw the matching of the data and sent the de-identified data to Principal Investigator. No compensation to the study population was provided. Students did not directly benefit from participating in this study.

Email invitations were deemed as informed consent by VCU Office of Research Subjects Protection and attached in Appendix A (Appendix A). A copy of Survey 1 and Survey 2 are also available in Appendix B and Appendix C (Appendix B and C).

Post-then-Retrospective Pre-test (RPT)

This study adopted the retrospective pre-test method. In post-then-retrospective pre-test (RPT), the post-test is done immediately following a completion of the program or intervention of interest followed by pre-test a few weeks later. In contrast, in the

traditional pre-and-post-test method, a pre-test is done prior to the initiation of the program of interest. Post-then-Retrospective Pre-test is recommended when the goal of the evaluation is to assess students' perception of change (subjective) and reflection on personal growth related to the program is desired. RPT is known to reduce response-shift bias (common confounder of traditional pre/post-test analysis) because survey respondents' cognitive level is not affected by the program of interest itself. Traditional pre-and-post-test methods can lead to underestimated program effect because subjects' cognitive level may have been shifted by the program or over time (Hill, 2005). In other words, subjects' inner criteria/standard may become stricter or more rigorous in assessing themselves which appear as no improvement in the outcome of interest even if it improved by the program. RPT can also be used to establish a baseline when the pre-test result was not available (Campbell, 1963). RPT has been demonstrated to be superior than the traditional pre/post-test analysis in measuring meaningful changes. Concerns with RPT include motivational, systematic cognitive biases of effort justification and presenting current-self better than past-self: respondents in RPT tend to think they are better now than before. These could result in the program's effect being overestimated (Hill, 2005). However, in this study situation, RPT was adopted because slight overestimation is not deemed to pose a significant problem as a baseline and describing change as program participants experienced and subjectively reflected on was the goal of the study.

Questionnaires

Survey instruments1 and 2 were identical except for the introductory paragraphs and the optional student characteristics (Appendix B and C). The questionnaires are based on Shiarella and McCarthy's Community Service Attitudes Scale with minor modifications to fit the need of this study. Pre-testing of the questionnaires was conducted with several faculty members at VCU SoD and the University of Iowa College

of Dentistry as well as first year dental students at VCU School of Dentistry, to ensure clarity. It should be noted that additional pediatric questions were included in the pre-testing, but none of these questions were used as part of the present study.

The introduction to the survey included a definition of community service. Community service was defined as "a regular activity to meet community needs where one uses his or her skills in dentistry." Questions measuring eight CSAS scales were distributed in the questionnaire in the same order as Shiarella and McCarthy's instrument. Questions 1 to 12 used seven point anchor scales of extremely likely, quite likely, slightly likely, neither likely nor unlikely, slightly likely, quite likely, and extremely likely while questions 13 to 46 used seven point anchor scales of strongly agree, disagree, slightly disagree, neither agree nor disagree, slightly agree, agree, and strongly agree. Questions 56 to 60 asked about demographics and student characteristics such as age, gender, ethnicity, volunteer activities, and whether or not being in the International Dentists Program. Please refer to Appendix B and C for details.

Analysis Plan

Power and Sample Size Calculation

Power and sample size calculation was not pursued in this study because we sent out the questionnaire to all eligible subjects. In this way, the sample size was essentially fixed to those responding to the questionnaire. However, sample size calculation would have helped determining whether nominal changes we detected were due to the small sample size or for other reasons.

Descriptive Statistics

Descriptive statistics were conducted for all variables to show distributions and frequency of each variable.

Hypothesis Testing

The experimental design was a pre-test post-test to address the first specific aim—to test the impact of the service-learning experience. The outcome variables were the 8 CSAS scales. A repeated-measures mixed-model analysis was used to test for a pre vs post difference across each of the same scales. The mixed-effect model allowed fixed effects (for example, in gender: between subjects effect), random-effects (among subjects), and repeated (scale across time) within the subject effects. The model for the first aim included the following effects: Time (pre-test and post-test), Scale, and the Time*Scale interaction. The interaction test permitted the determination of whether there was time effect separately for each of the 8 scales. SAS software was used for all analyses (version 9.3, SAS Institute Inc, Cary NC).

The second specific aim addressed the impact of selected student characteristics: age, gender, and etc. on the post-test scores. Testing for this impact was done in two phases. During phase one, each of the characteristics were included in the repeated-measures model and then those that were found to be significant were included in the final model during phase two. For instance, to determine if gender has a differential impact, the following effects were included in the model: Pre-test, Scale, Pre-test*Scale, Gender, Gender*Scale. The effects of interest were the Gender and Gender*Scale interaction. If they were found to be significant ($P < 0.2$), the phase two model then included all the student characteristics that passed this screen. Significant factors were retained in the final model.

CHAPTER IV

RESULTS

Introduction

In this chapter, demographic information about those who participated in the survey will be described first. Then the responses to each of the survey items at pre- and post-test are described. The first specific aim of the study was to test if there was a change from pre- to post-test, and this is discussed in the later section. Finally, the relationship between the post-test scales and demographics is explored.

Study Population

There were 76 senior dental students (class of 2012) who responded to the first survey (post-test), out of 105 eligible (response rate: 72%). Only those who responded to the first survey were invited to complete the second survey (pre-test: please note that the pre-test was done after the post-test in this study) and 56 responded (response rate: 74%). The demographic characteristics of the respondents are summarized in Table 1. Out of 76 respondents, 33 (43%) were female and 43 (57%) were male. The average age of respondents was 28.1 years (SD = 2.89) and the age ranged from 25 to 38. Self-identified ethnicity revealed 53 (70%), 2 (3%), 1 (1%), 0, and 20 (26%) for White, Black, Hispanic, American Indian, and Asian, respectively. Five students identified themselves to belong to the IDP (International Dentist Program) where they joined the VCU SoD as junior dental students. For the entire class of 2012, the mean age was 28.4 and there were 39 female (33%) and 66 male (63%) students. This distribution of age and gender were similar to those of the survey respondents. When comparing those who completed both the pre- and post-test to those who only completed the post-test, there was no difference in gender, age, or ethnicity ($P > 0.3$).

Prior to dental school, 47% (n=36) did community or volunteer work regularly and during dental school 29% (n=22) regularly participated in volunteer community service activity (not assigned) outside the dental school curriculum. Out of twenty-two students who indicated they volunteer regularly during dental school, sixteen of them stated that they volunteered regularly prior to dental school and the remaining six stated that they volunteered occasionally prior to dental school. The percentages of those who did this occasionally was 50% (n=38) prior to dental school and 63% (n=48) during dental school. Only two did no volunteer work before dental school and 6 did no volunteer work during dental school.

Description of the Individual CSAS Items

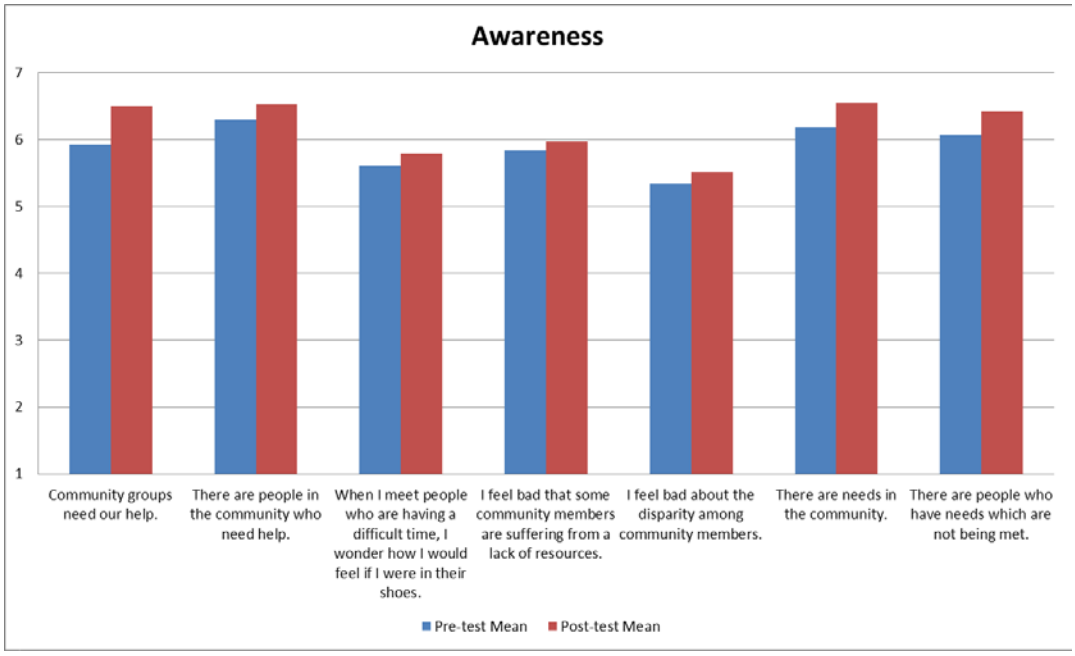
Tables 2 to 9 present distributions for each question item of the eight Community Service Attitudes Scales in terms of percentages in seven-point scale: strongly disagree to strongly agree and mean and standard deviation of each question item and the average for the scale. Hypothesis testing to compare pre-test and post-test means at each question level was not attempted because multiple comparisons with the small sample size of 56 (pre-test) will not allow enough statistical power to detect differences with validity. The intention of the diagrams is to show pre-test and post-test means differences at each question level visually and informally.

Awareness

Percentage distribution of the seven items in awareness scale is presented in Table 2. For most items, the vast majority agreed as indicating slightly agree, agree, and strongly agree. The proportion of those who disagreed decreased between pre- and post-test for some of the awareness items. For example, for the question item “I feel bad about the disparity among community members” eleven percent disagreed in pre-test and eight percent disagreed in post-test.

Figure 4 shows the comparison of pre and post-test means of each question item in the awareness scale. The means ranged from 5.34 (I feel bad about disparities among community members) to 6.29 (There are people in the community who need help) for pre-test and from 5.51(I feel bad about disparity among community members) to 6.55 (There are needs in the community) for post-test. Average of the awareness scale items means was 5.90 for pre-test and 6.18 for post-test. Pre-test-post-test differences ranged from 0.13 (I feel bad that some community members are suffering from a lack of resources) to 0.57 (community groups need our help).

Figure 4: Awareness: Pre-test and post-test means

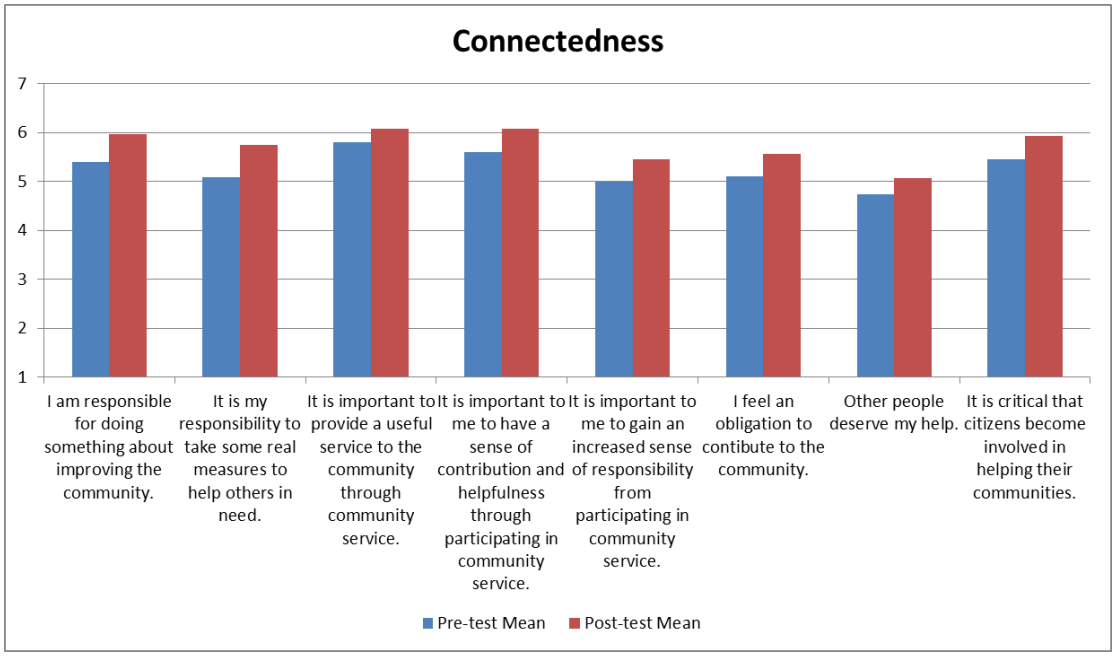


(Note: In the vertical axis, the numbers correspond to anchor scales as follows. 7: Strongly agree, 6:Agree, 5:Slightly agree, 4:Neither agree nor disagree, 3:Slightly disagree, 2:Disagree, 1:Strongly disagree)

Connectedness

The percentage distribution of the eight items in connectedness scale is presented in Table 3. Although for most items the majority of the responses were in “slightly agree”, “agree”, and “strongly agree”, there were some who responded that they “strongly disagree”, “disagree”, “slightly disagree’, and “neither agree nor disagree”. Compared to the awareness scale that was heavily populated in agree and strongly agree, the connectedness scale showed a more even percentage distribution. This led to the means ranging from 4.73 (Other people deserve my help) to 5.8 (It is important to provide a useful service to the community through community service) for pre-test and from 5.45 (It is important to me to gain an increased sense of responsibility from participating in community service) to 6.08 (It is important to me to have a sense of contribution and helpfulness through participating in community service) for post-test. One question: “other people deserve my help” got the lowest pre-test mean of 4.73 as well as the lowest post-test mean of 5.07. Figure 5 shows the comparison of pre and post-test means of each question item of connectedness scale. Average of the awareness scale items means was 5.28 for pre-test and 5.74 for post-test, slightly lower than those of the awareness scale.

Figure 5: Connectedness: Pre-test and post-test means



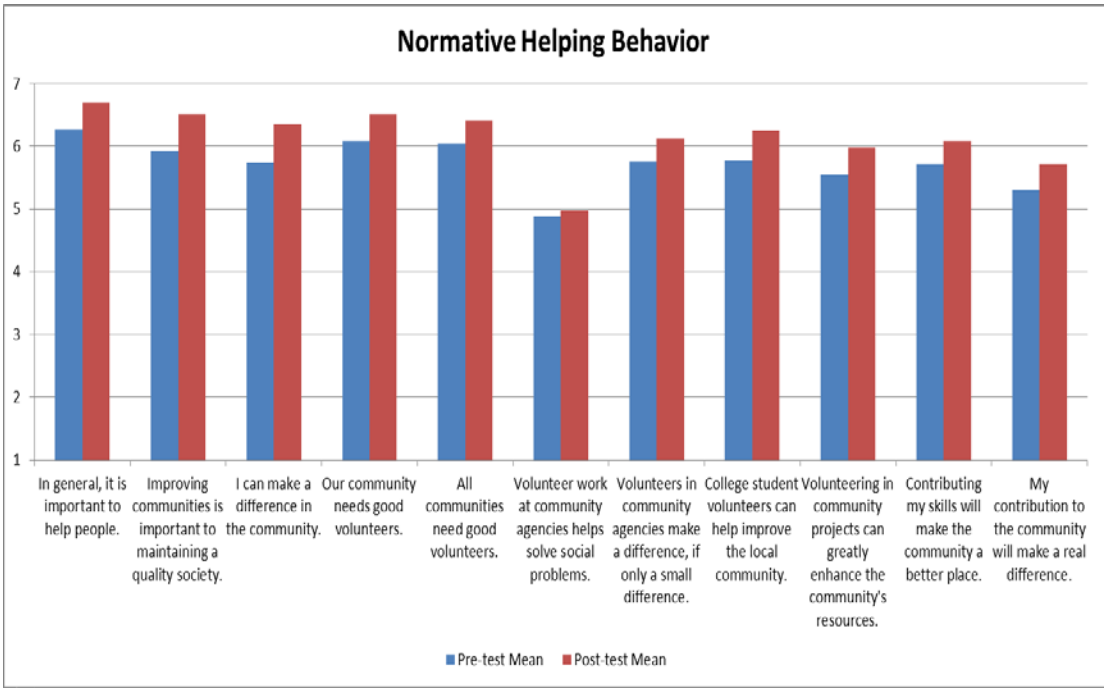
(Note: In the vertical axis, the numbers correspond to anchor scales as follows. 7: Strongly agree, 6:Agree, 5:Slightly agree, 4:Neither agree nor disagree, 3:Slightly disagree, 2:Disagree, 1:Strongly disagree)

Normative Helping Behavior

Percentage distribution of the eleven items in normative helping behavior scale is presented in Table 4. For most items the majority of the respondents agreed as indicating "slightly agree", "agree", and "strongly agree". One question item "Volunteer work at community agencies helps solve social problems" had only 64 percent of the respondents agree in pre-test and 74 percent in post-test. Compared to the awareness scale that was heavily populated with agree and strongly agree responses, the normative helping behavior scale showed a more even distribution.

The means of the normative helping behavior scale ranged from 4.89 (Volunteer work at community agencies helps solve social problems) to 6.27 (In general, it is important to help people) for pre-test and 4.97 (Volunteer work at community agencies help solve social problems) to 6.7 (In general, it is important to help people) for post-test. Figure 6 shows the comparison of pre and post-test means of each question item of connectedness scale. The average of the normative helping behavior scale items means was 5.74 for pre-test and 6.15 for post-test, slightly higher than those of the connectedness scale.

Figure 6: Normative Helping Behavior: Pre-test and post-test means

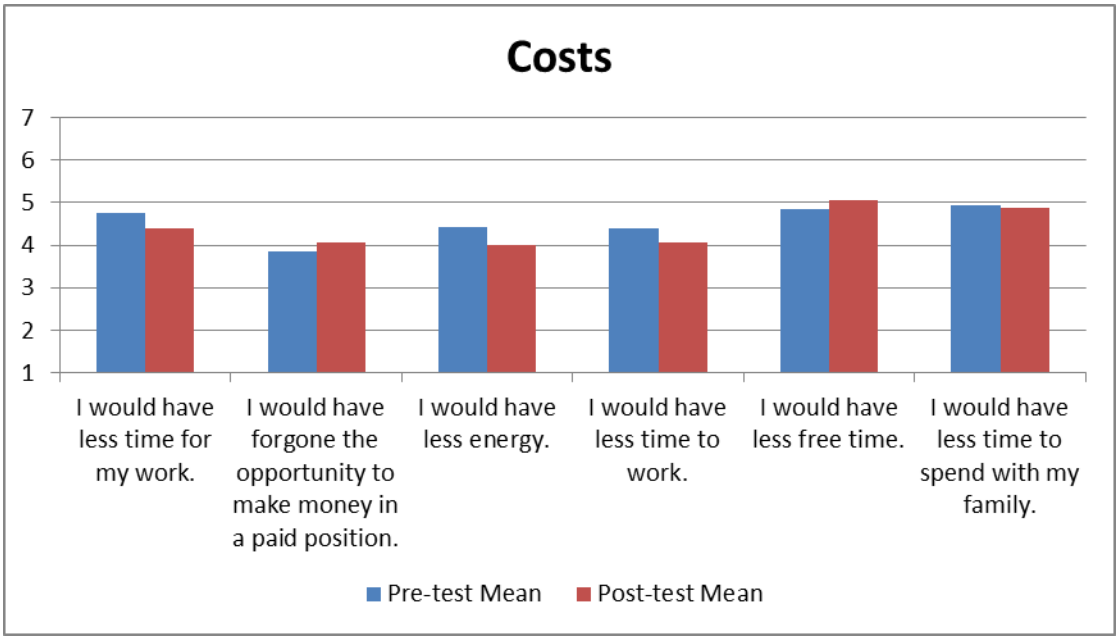


(Note: In the vertical axis, the numbers correspond to anchor scales as follows. 7: Strongly agree, 6:Agree, 5:Slightly agree, 4:Neither agree nor disagree, 3:Slightly disagree, 2:Disagree, 1:Strongly disagree)

Costs

The percentage distribution of the six items in costs scale is presented in Table 5. Compared to other scales, the costs scale showed more even distribution among "unlikely", "neutral (neither likely nor unlikely)", and "likely". Means of the costs scale ranged from 3.86 (I would have forgone the opportunity to make money in a paid position) to 4.95 (I would have less time to spend with my family) for pre-test and 3.99 (I would have less energy) to5.05(I would have less free time) for post-test. Figure 7 shows the comparison of pre and post-test means of each question item of costs scale. The average of the costs scale items means was 4.54 for pre-test and 4.41 for post-test, lower than those of the other scales.

Figure 7: Costs: Pre-test and post-test means



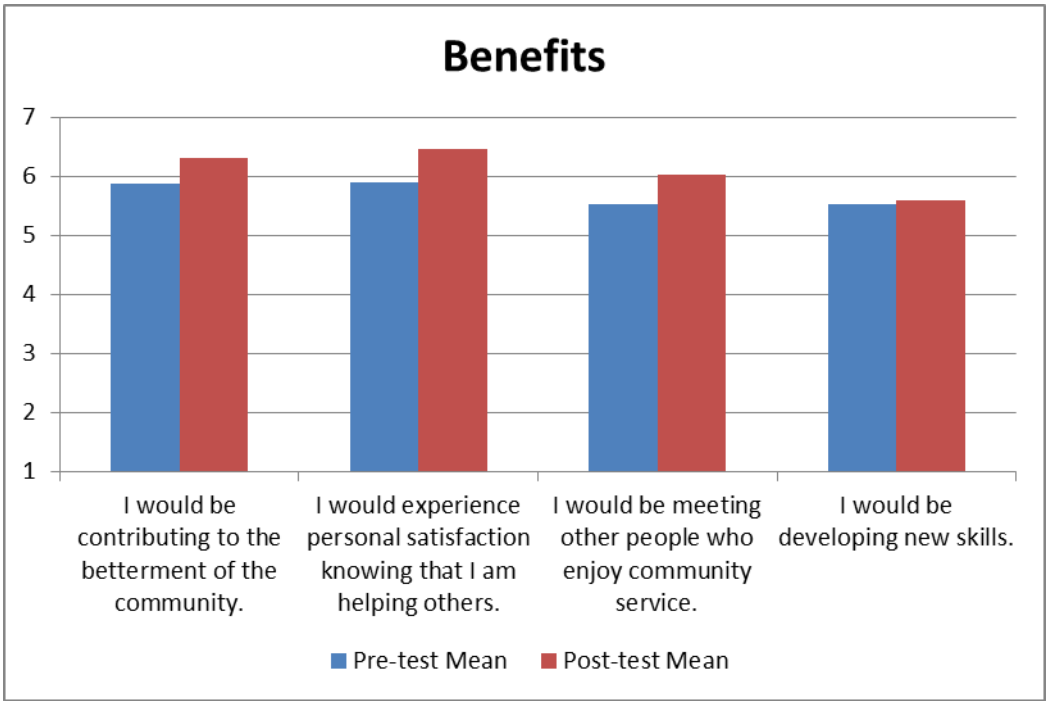
(Note: In the vertical axis, the numbers correspond to anchor scales as follows. 7: Extremely likely, 6:Quite likely, 5:Slightly likely, 4:Neither likely nor unlikely, 3:Slightly unlikely, 2:Quite unlikely, 1:Extremely unlikely)

Benefits

The percentage distribution of the four items in benefits scale is presented in Table 5. This scale showed the percentage distribution of responses as mostly “likely”, “slightly likely”, “quite likely”, and “extremely likely”. The means of the benefits scale ranged from 5.54 (I would be meeting other people who enjoy community service; I would be developing new skills) to 5.91 (I would experience personal satisfaction knowing that I am helping others) for pre-test and 5.59 (I would be developing new skills) to 6.47 (I would experience personal satisfaction knowing that I am helping others) for post-test. Figure 8 shows the comparison of pre and post-test means of each question

item of benefits scale. The average of the benefits scale items means was 5.72 for pre-test and 6.09 for post-test.

Figure 8: Benefits: Pre-test and post-test means

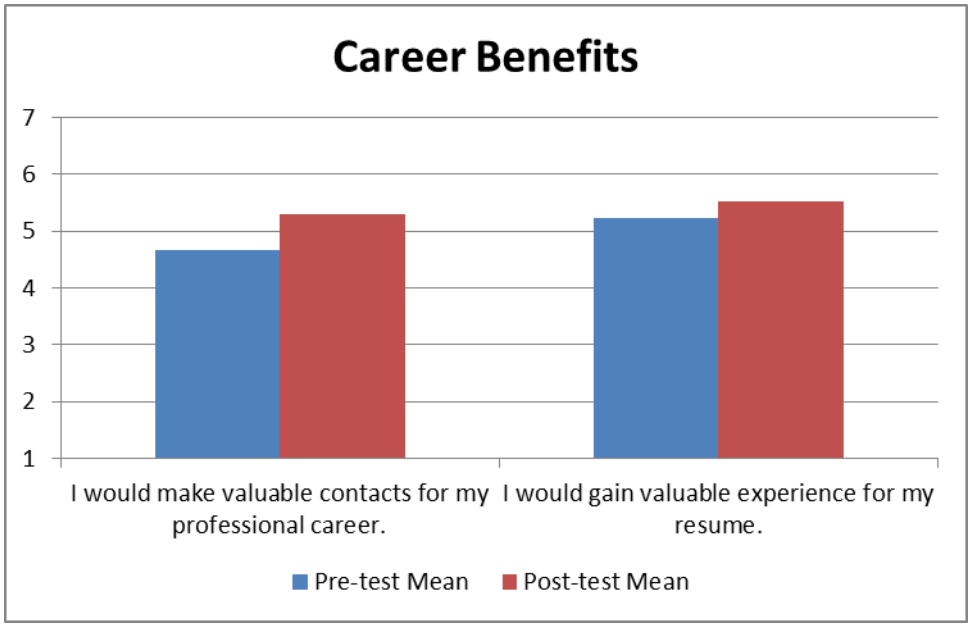


(Note: In the vertical axis, the numbers correspond to anchor scales as follows. 7: Extremely likely, 6:Quite likely, 5:Slightly likely, 4:Neither likely nor unlikely, 3:Slightly unlikely, 2:Quite unlikely, 1:Extremely unlikely)

Career Benefits

The percentage distribution of the two items in career benefits scale is presented in Table 57. Although more than fifty percent of responses were “likely” (extremely likely, likely, and slightly likely), there were meaningful percentages of neutral and unlikely responses. The means of the career benefits scale ranged from 4.66 (I would make valuable contacts for my professional career) to 5.24 (I would gain valuable experience for my resume) for pre-test and 5.29 (I would make valuable contacts for my professional career) to 5.52 (I would gain valuable experience for my resume) for post-test. Figure 9 shows the comparison of pre and post-test means of each question items of career benefits scale. The average of the benefits scale items means was 4.96 for pre-test and 5.41 for post-test.

Figure 9: Career Benefits: Pre-test and post-test means



(Note: In the vertical axis, the numbers correspond to anchor scales as follows. 7: Extremely likely, 6:Quite likely, 5:Slightly likely, 4:Neither likely nor unlikely, 3:Slightly unlikely, 2:Quite unlikely, 1:Extremely unlikely)

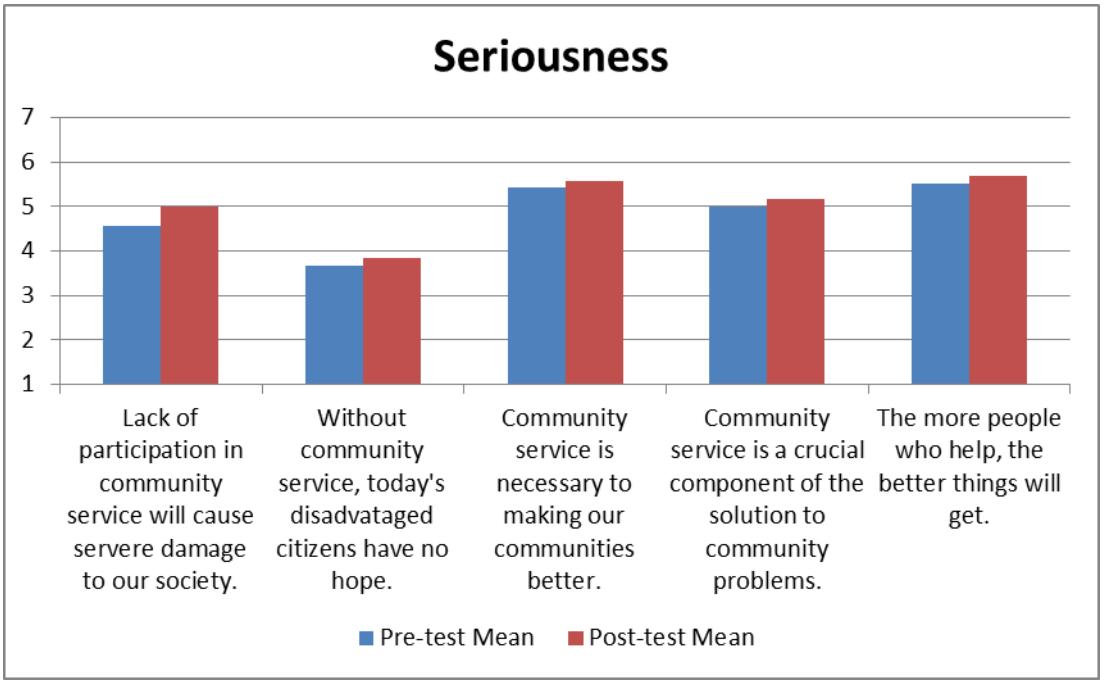
Seriousness

The percentage distribution of the five items in seriousness scale is presented in Table 5. This scale showed fairly even distribution over the seven anchor scale points: "strongly disagree" to "strongly agree". For some question items, percentages for agree were much lower than those of other scales. For example, for the question item "Without community service, today's disadvantaged citizens have no hope" only 31 percent of the respondents agreed in pre-test and 39 percent in post-test.

The means of the seriousness scale ranged from 3.68 (Without community service, today's disadvantaged citizens have no hope) to 5.52 (The more people who

help, the better things will get) for pre-test and 3.84 (Without community service, today's disadvantaged citizens have no hope) to 5.68 (The more people who help, the better things will get) for post-test. Figure 10 shows the comparison of pre and post-test means of each question items of seriousness scale. The average of the benefits scale items means was 4.83 for pre-test and 5.06 for post-test.

Figure 10: Seriousness: Pre-test and post-test means

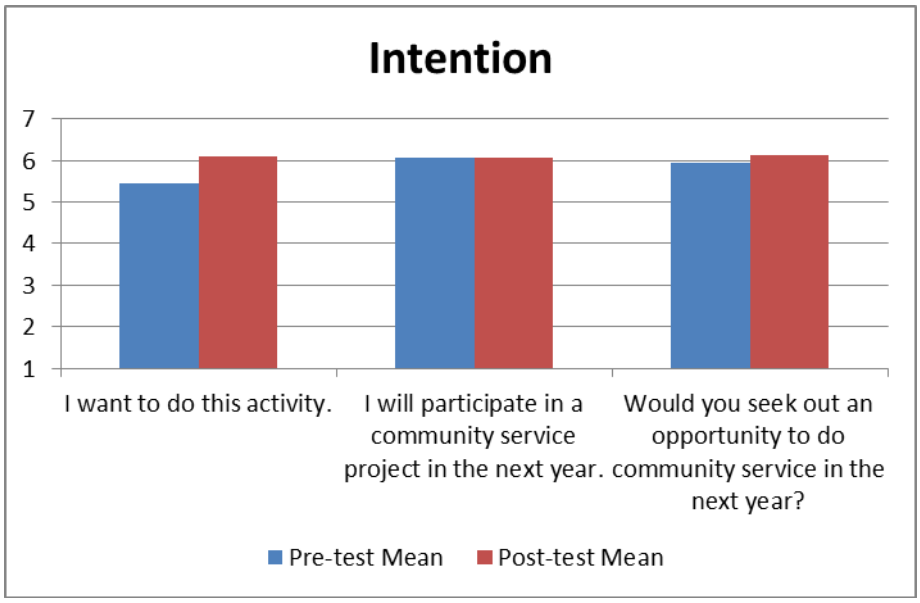


(Note: In the vertical axis, the numbers correspond to anchor scales as follows. 7: Strongly agree, 6:Agree, 5:Slightly agree, 4:Neither agree nor disagree, 3:Slightly disagree, 2:Disagree, 1:Strongly disagree)

Intention

The percentage distribution of the three items in intention scale is presented in Table 59. For most of the intention scale, the vast majority of the respondents agreed with the statements. The means of the intention scale ranged from 5.45 (I want to do this activity) to 6.05 (I will participate in a community service project in the next year) for pre-test and 6.08 (I will participate in a community service project in the next year) to 6.14 (Would you seek out an opportunity to do community service in the next year) for post-test. Figure 11 shows the comparison of means of each question items of intention scale pre and post-test. The average of the intention scale items means was 5.81 for pre-test and 6.11 for post-test.

Figure 11: Intention: Pre-test and post-test means



(Note: In the vertical axis, the numbers correspond to anchor scales as follows. 7: Strongly agree, 6:Agree, 5:Slightly agree, 4:Neither agree nor disagree, 3:Slightly disagree, 2:Disagree, 1:Strongly disagree)

Correlation between the Scales

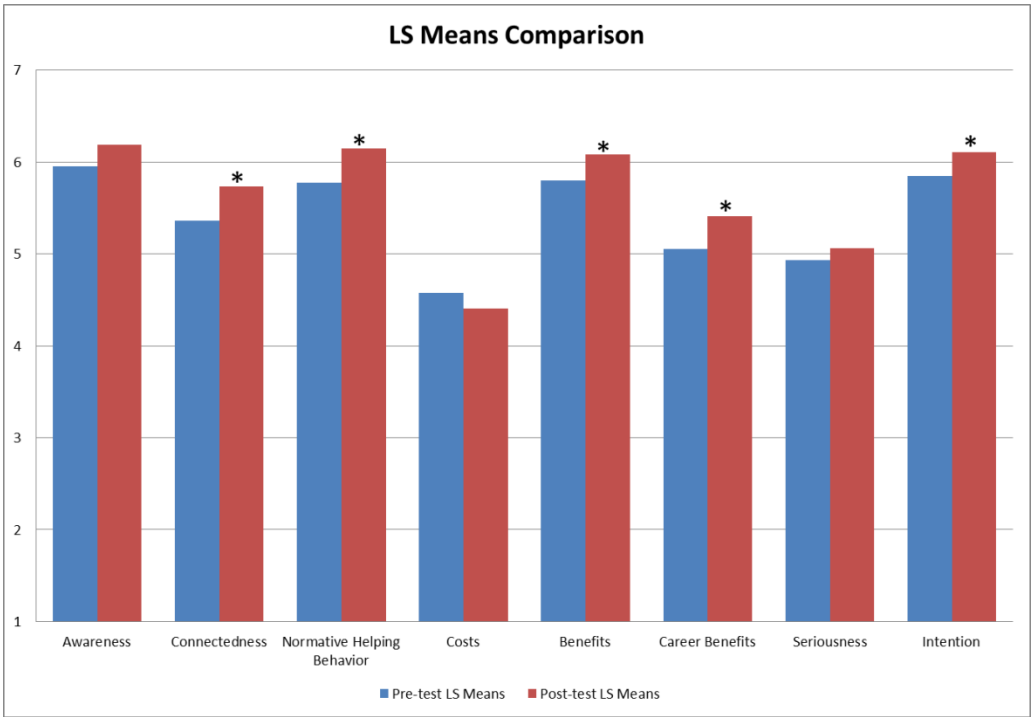
The correlations (Pearson correlation *r*) between the eight scales are shown in Table 10. Most of the correlations are positive and some are close to 1. It should be noted that in the scale of "cost" the negative r should be interpreted as positive *r* because the seven-point anchor scale in cost scale would mean opposite to other scales: "extremely unlikely" to cost would mean positive community service attitude while the same statement to the awareness scale would mean negative community service attitude. Most correlations had significant p-value as noted in Table 10.

Change in attitudes

The pre- versus post-test change across the 8 scales was tested using a repeated-measures mixed-model ANOVA which accounted for the dependencies between the eight scales and across the two occasions. The least-squared means for each occasion and the change score are summarized in Table 11. The overall result of the multivariate ANOVA indicated that there was a change across the two occasions ($F(8,552) = 4.82$, $P < .0001$). The p-value column in Table 11 shows the test result for each of the eight scales. Awareness had a pre-test mean of 5.9 and it nominally increased to 6.2, a non-significant change of 0.23 ($P = 0.0514$). There was a significant change in connectedness, normative helping behaviors, benefits, career benefits, and intention; and no evidence for a change on costs or seriousness. Figure 12 visually shows this finding. The P-value for time*scale interaction was 0.065 indicating there was not sufficient evidence to say there were

different amount of changes across scale: service-learning program's impact did not depend on scale.

Figure 12: Pre-test and Post-test LS Means



(Notes:

1. * denotes pre-test and post-test changes with p-value less than 0.05

2. For scales of costs, benefits, and career benefits, the vertical axis numbers correspond to anchor scales as follows. 7: Extremely likely, 6:Quite likely, 5:Slightly likely, 4:Neither likely nor unlikely, 3:Slightly unlikely, 2:Quite unlikely, 1:Extremely unlikely)

3. For all other scales, the vertical axis numbers correspond to anchor scales as follows. 7: Strongly agree, 6:Agree, 5:Slightly agree, 4:Neither agree nor disagree, 3:Slightly disagree, 2:Disagree, 1:Strongly disagree)

Test of Demographic Differences on the Post-test

The following demographic characteristics were tested for differences on the post-test means: gender, ethnicity, age, previous and present volunteer experience. Age was a continuous variable while all other variables were categorical variables. Ethnicity was categorized to White and non-White because the other specific race/ethnicity categories had small sample sizes. For the purpose of analysis, for both of the volunteer experience variables, the "none" category was collapsed into a category with "occasionally" because of small sample size. To test for differences due to demographics, a repeated-measures mixed-model was used. It included Scale as a random effect to account for the dependence between the scales and nested effects for each of the demographic factors to test for the significance of that factor across all eight scales. The results are shown in Tables 12 to 17. There were no differences on any of the demographic characteristics except for those who indicated that their race was white. The comparisons of the two race groups are shown in Table 13. Note that although the overall test for a significant race difference (P = 0.0454) is a simultaneous test that accounts for all other comparisons, the p-values shown in Table 13 are not corrected for multiple comparisons. As there are 5*8=40 individual statistical tests, a Bonferroni-corrected alpha level would be 0.05/40=0.00125. That is, the p-values shown in Table 13 and subsequent tables should be compared with this corrected alpha level. So, although in Table 13 indicates that there is a race effect on the "costs" scale (P = 0.0139), a conservative interpretation of this difference may find it not effective. Table 14 shows the relationship between age and each of the scales. No p-value was significant even at the liberal threshold of 0.05 before Bonferroni adjustment. Table 15 summarizes the gender differences. Scales of connectedness, career benefits, and seriousness showed p-value less than 0.05 but no scale showed evidence of significance with the corrected alpha level of 0.00125 like mentioned above. Table 16 summarizes the previous volunteer differences and each scale: no significant p-value even at the liberal threshold of 0.05 before Bonferroni

adjustment. Table 17 shows the summary of the differences between currently being a regular volunteer or occasional/non volunteer. One scale: intention showed p-value less than 0.05 but no scale showed significant p-values with the corrected alpha level of 0.00125.

Students' Comments to Service-learning Program

Survey respondents were asked to comment about the service-learning program. While no analyses of these comments were attempted, the comments fell into a few categories. Of the eleven students who provided comments, four complained about the travel and time commitment involved and coordination of the rotations: they said scheduling needs to be improved to allow students to travel back home safely and prevent a long period of absences from treating their patients in the dental school clinic. A couple of them commented on the specific questions on the questionnaire: they considered some words used in the questionnaire not very appropriate. Examples include 'deserve', 'responsibility' and 'obligation' Five students made statements to express their views that providing care to under-served individuals was not their obligation and that people should be more self-reliant. The students did not like unappreciative attitude of some patients.

As a practicing dentist the biggest barrier to provide community service was identified as "time: I would not have extra time" (66%, n=50). The next most common was "money: I have loans to pay for" (33%, n=25). One person said "interest: I am not interested in community service."

Table 1: Demographic information (n = 76)

CHARACTERISTICS	N	%
Gender		
Female	33	43
Male	43	57
Race/Ethnicity		
White	53	70
Black	2	3
Hispanic	1	1
Am. Indian	0	0
Asian	20	26
IDP student		
no	71	93
yes	5	7
Age		
≤ 25	10	13
26-29	46	61
≥ 30	19	25
Volunteer prior to dental school		
Regularly	36	47
Occasionally	38	50
No	2	3
Volunteer during dental school		
Regularly	22	29
Occasionally	48	63
No	6	8

(Note: the Race/Ethnicity question indicated “check all that apply”)

Table 2: Summary of Awareness Scale Items

	Awareness Percentage								
	Strongly disagree	**Disagree**	**Slightly disagree**	**Neither agree nor disagree**	**Slightly agree**	**Agree**	**Strongly agree**	**Mean**	**SD**
Community groups need our help.									
Pre-test	2			4	18	49	27	5.93	1.03
Post-test					4	42	54	6.50	0.58
There are people in the community who need help.									
Pre-test	2				4	54	41	6.29	0.91
Post-test		1			3	35	61	6.53	0.76
When I meet people who are having a difficult time, I wonder how I would feel if I were in their shoes.									
Pre-test	2		5	4	25	45	18	5.60	1.18
Post-test		3		5	22	47	22	5.79	1.02
I feel bad that some community members are suffering from a lack of resources.									
Pre-test	2		2	2	20	53	22	5.84	1.05
Post-test		3	1		17	50	29	5.97	1.01
I feel bad about the disparity among community members.									
Pre-test	2	4	5	9	25	39	16	5.34	1.37
Post-test	1	5	1	7	25	39	21	5.51	1.34
There are needs in the community.									
Pre-test		2			11	51	36	6.18	0.86
Post-test					4	37	59	6.55	0.57

Table 2: Continued									
There are people who have needs which are not being met.									
Pre-test	2				11	61	27	6.07	0.91
Post-test	1				5	39	54	6.42	0.87
Average									
Pre-test								5.90	0.85
Post-test								6.18	0.60

Table 3: Summary of Connectedness Scale Items

	Connectedness Percentage								
	Strongly disagree	**Disagree**	**Slightly disagree**	**Neither agree nor disagree**	**Slightly agree**	**Agree**	**Strongly agree**	**Mean**	**SD**
I am responsible for doing something about improving the community.									
Pre-test	2		7	11	27	36	18	5.39	1.27
Post-test		3	3	4	13	41	36	5.96	1.16
It is my responsibility to take some real measures to help others in need.									
Pre-test	5	2	9	9	27	31	16	5.09	1.58
Post-test		4	3	5	24	32	33	5.75	1.27
It is important to provide a useful service to the community through community service.									
Pre-test	2		2	2	21	54	20	5.80	1.03
Post-test				8	11	47	34	6.08	0.88
It is important to me to have a sense of contribution and helpfulness through participating in community service.									
Pre-test	2		4	9	20	50	16	5.59	1.16
Post-test		1		4	14	45	36	6.08	0.93
It is important to me to gain an increased sense of responsibility from participating in community service.									
Pre-test	5	2	7	20	18	36	13	5.00	1.55
Post-test		5	3	12	22	38	20	5.45	1.32
I feel an obligation to contribute to the community.									
Pre-test	4	4	5	9	34	34	11	5.11	1.41
Post-test	1	4	5	8	22	26	33	5.57	1.46

Table 3: Continued									
Other people deserve my help.									
Pre-test	7	7	7	13	27	25	13	4.73	1.73
Post-test	9	5	3	9	17	39	17	5.07	1.81
It is critical that citizens become involved in helping their communities.									
Pre-test	2		2	15	24	45	13	5.45	1.14
Post-test				7	17	54	22	5.92	0.81
Average									
Pre-test								5.28	1.14
Post-test								5.74	0.93

Table 4: Summary of Normative Helping Behavior Scale Items

	Normative Helping Behavior Percentage								
	Strongly disagree	**Disagree**	**Slightly disagree**	**Neither agree nor disagree**	**Slightly agree**	**Agree**	**Strongly agree**	**Mean**	**SD**
In general, it is important to help people.									
Pre-test	2			4		52	43	6.27	0.98
Post-test				1	3	21	75	6.70	0.59
Improving communities is important to maintaining a quality society.									
Pre-test	2			4	16	54	25	5.93	1.01
Post-test				1	5	34	59	6.51	0.66
I can make a difference in the community.									
Pre-test	2			4	32	40	23	5.74	1.06
Post-test			1		11	38	50	6.35	0.78
Our community needs good volunteers.									
Pre-test	2			2	7	60	29	6.09	0.95
Post-test				1	1	42	55	6.51	0.60
All communities need good volunteers.									
Pre-test	2				13	61	25	6.04	0.91
Post-test		1		1	7	36	55	6.41	0.85
Volunteer work at community agencies helps solve social problems.									
Pre-test	4	2	7	24	29	22	13	4.89	1.42
Post-test	1	4	9	12	39	24	11	4.97	1.33
Volunteers in community agencies make a difference, if only a small difference.									
Pre-test	2		2		27	51	18	5.76	1.02
Post-test		1		1	16	45	36	6.12	0.88

Table 4: Continued									
College student volunteers can help improve the local community.									
Pre-test	2			4	25	52	18	5.77	0.99
Post-test			1		8	54	37	6.25	0.71
Volunteering in community projects can greatly enhance the community's resources.									
Pre-test	2	2		5	36	38	18	5.55	1.14
Post-test			1	3	17	54	25	5.99	0.81
Contributing my skills will make the community a better place.									
Pre-test	2			4	32	43	20	5.71	1.02
Post-test				3	17	49	32	6.09	0.77
My contribution to the community will make a real difference.									
Pre-test	2		2	11	43	33	9	5.30	1.06
Post-test			1	1	38	43	16	5.71	0.80
Average									
Pre-test								5.74	0.89
Post-test								6.15	0.53

Table 5: Summary of Costs Scale Items

	Costs Percentage								
	Extremely unlikely	**Quite unlikely**	**Slightly unlikely**	**Neither likely nor unlikely**	**Slightly likely**	**Quite likely**	**Extremely likely**	**Mean**	**SD**
I would have less time for my work.									
Pre-test	5	4	7	18	30	32	4	4.75	1.44
Post-test	3	5	12	33	28	17	3	4.39	1.28
I would have forgone the opportunity to make money in a paid position.									
Pre-test	11	16	9	21	30	9	4	3.86	1.65
Post-test	5	16	14	20	24	18	3	4.07	1.58
I would have less energy.									
Pre-test	7	7	7	25	25	20	7	4.44	1.61
Post-test	9	14	13	20	22	17	4	3.99	1.69
I would have less time to work.									
Pre-test	4	11	11	20	30	21	4	4.41	1.49
Post-test	5	9	20	18	37	8	3	4.07	1.41
I would have less free time.									
Pre-test	4	11	7	9	24	36	9	4.84	1.64
Post-test	3	5	8	3	39	34	8	5.05	1.38
I would have less time to spend with my family.									
Pre-test	4	11	7	5	25	36	13	4.95	1.67
Post-test	4	8	8	4	35	33	8	4.89	1.55
Average									
Pre-test								4.54	1.33

Table 5: Continued									
Post-test								4.41	1.12

Table 6: Summary of Benefits Scale Items

	Benefits Percentage								
	Extremely unlikely	**Quite unlikely**	**Slightly unlikely**	**Neither likely nor unlikely**	**Slightly likely**	**Quite likely**	**Extremely likely**	**Mean**	**SD**
I would be contributing to the betterment of the community.									
Pre-test	4			4	7	64	21	5.89	1.15
Post-test	1	1			8	38	51	6.32	1.02
I would experience personal satisfaction knowing that I am helping others.									
Pre-test	4	2		2	7	59	27	5.91	1.27
Post-test	1	1			3	33	62	6.47	0.99
I would be meeting other people who enjoy community service.									
Pre-test	4	2	2	4	27	45	18	5.54	1.32
Post-test	1		1	3	16	44	35	6.03	1.04
I would be developing new skills.									
Pre-test	2	5		5	25	43	20	5.54	1.33
Post-test	1	3	1	7	26	42	20	5.59	1.20
Average									
Pre-test								5.72	1.14
Post-test								6.09	0.91

Table 7: Summary of Career Benefits Scale Items

	Career Benefits Percentage								
	Extremely unlikely	**Quite unlikely**	**Slightly unlikely**	**Neither likely nor unlikely**	**Slightly likely**	**Quite likely**	**Extremely likely**	**Mean**	**SD**
I would make valuable contacts for my professional career.									
Pre-test	5	2	14	18	34	14	13	4.66	1.53
Post-test	1	1	5	9	36	35	12	5.29	1.18
I would gain valuable experience for my resume.									
Pre-test	5	2	4	20	16	27	25	5.24	1.63
Post-test		1	1	13	28	40	16	5.52	1.04
Average									
Pre-test								4.96	1.38
Post-test								5.41	0.95

Table 8: Summary of Seriousness Scale Items

	Seriousness Percentage								
	Strongly disagree	**Disagree**	**Slightly disagree**	**Neither agree nor disagree**	**Slightly agree**	**Agree**	**Strongly agree**	**Mean**	**SD**
Lack of participation in community service will cause service damage to our society.									
Pre-test	2	5	14	29	21	20	9	4.57	1.43
Post-test	1	4	7	13	39	28	8	5.00	1.25
Without community service, today's disadvantaged citizens have no hope.									
Pre-test	7	23	21	18	11	13	7	3.68	1.73
Post-test	12	11	17	21	24	9	5	3.84	1.67
Community service is necessary to making our communities better.									
Pre-test	4		2	5	38	36	15	5.42	1.23
Post-test	1	4	1	3	30	39	21	5.59	1.25
Community service is a crucial component of the solution to community problems.									
Pre-test	4	2	11	11	33	27	13	5.00	1.45
Post-test	1	4	8	12	26	36	13	5.17	1.37
The more people who help, the better things will get.									
Pre-test	2	4		11	25	38	21	5.52	1.31
Post-test		3	4	5	26	34	28	5.68	1.20
Average									
Pre-test								4.83	1.20
Post-test								5.06	1.05

Table 9: Summary of Intention Scale Items

	Intention Percentage								
	Strongly disagree	**Disagree**	**Slightly disagree**	**Neither agree nor disagree**	**Slightly agree**	**Agree**	**Strongly agree**	**Mean**	**SD**
I want to do this activity.									
Pre-test	2	2	4	9	25	45	14	5.45	1.23
Post-test					13	63	24	6.11	0.60
I will participate in a community service project in the next year.									
Pre-test	2			5	7	54	32	6.05	1.03
Post-test	1	1		5	8	46	38	6.08	1.10
Would you seek out an opportunity to do community service in the next year?									
Pre-test		2		5	18	46	29	5.93	0.99
Post-test			1	3	16	41	39	6.14	0.87
Average									
Pre-test								5.81	0.95
Post-test								6.11	0.72

Table 10: Pearson Correlation between the Scales

Scale	Connectedness	Normative	Costs	Benefits	Career benefits	Seriousness	Intention
Awareness	0.71***	0.78***	0.05	0.41***	0.37***	0.58***	0.57***
Connectedness		0.79***	-0.14	0.47***	0.46***	0.74***	0.56***
Normative			-0.05	0.44***	0.46***	0.69***	0.61***
Costs				0.17***	0.04	-0.18*	-0.07
Benefits					0.68***	0.36***	0.35***
Career benefits						0.43***	0.25***
Seriousness							0.36***
Intention							

(* P < .05, ** P < .01, *** P < .005)

Table 11: Pre- versus Post-test Change on the Scales

Scale	Occasion	LS Mean	SE	95% CI		p-value
Awareness						
	Pre	5.954	0.096	5.766	6.142	
	Post	6.184	0.087	6.012	6.355	
	Diff.	0.230	0.118	-0.001	0.461	0.0514
Connectedness						
	Pre	5.363	0.130	5.108	5.618	
	Post	5.736	0.120	5.501	5.972	
	Diff.	0.373	0.121	0.135	0.612	0.0022*
Normative helping behaviors						
	Pre	5.775	0.094	5.590	5.960	
	Post	6.149	0.089	5.975	6.323	
	Diff.	0.374	0.115	0.147	0.601	0.0013*
Costs						
	Pre	4.573	0.148	4.283	4.864	
	Post	4.407	0.135	4.141	4.672	
	Diff.	-0.167	0.126	-0.415	0.082	0.1875
Benefits						
	Pre	5.799	0.119	5.566	6.033	
	Post	6.086	0.107	5.875	6.296	
	Diff.	0.286	0.122	0.046	0.526	0.0195*
Career benefits						
	Pre	5.057	0.135	4.792	5.323	
	Post	5.408	0.123	5.167	5.649	
	Diff.	0.351	0.124	0.106	0.595	0.0050*
Seriousness						
	Pre	4.931	0.140	4.657	5.205	
	Post	5.064	0.129	4.810	5.318	
	Diff.	0.133	0.123	-0.109	0.375	0.2810
Intention						
	Pre	5.849	0.106	5.640	6.058	
	Post	6.110	0.093	5.926	6.293	
	Diff.	0.261	0.122	0.021	0.500	0.0328*

(Note: The p-value was calculated by repeated-measures mixed-model ANOVA at the significance level of 0.05. which is noted by *)

Table 12: Demographic Analysis of the Post-test

Effect	df	F	p-value
Scale	7	0.34	0.9352
Gender(Scale)	8	1.42	0.2054
Age(Scale)	8	0.16	0.9957
White(Scale)	8	2.12	0.0454*
Previous(Scale)	8	0.79	0.6134
Current(Scale)	8	1.99	0.0602
Error	70		

(Note: The repeated-measures mixed-model included Scale as a random effect to account for the dependence between the scales. The nested effects for each of the demographic factors tested for the significance of that factor across all eight scales.)

Table 13: Race differences on the post-test

Scale	Race, White	LS Mean	SE	95% CI		p-value
Awareness						
	White	6.312	0.089	6.134	6.489	
	Non-White	6.053	0.133	5.788	6.317	
	difference	-0.259	0.159	-0.576	0.058	0.1075
Connectedness						
	White	5.928	0.135	5.659	6.197	
	Non-White	5.676	0.201	5.275	6.076	
	difference	-0.252	0.241	-0.732	0.228	0.2982
Normative helping behavior						
	White	6.214	0.081	6.052	6.376	
	Non-White	6.041	0.121	5.800	6.282	
	difference	-0.173	0.145	-0.463	0.116	0.2363
Costs						
	White	4.589	0.165	4.259	4.919	
	Non-White	3.845	0.246	3.353	4.336	
	difference	-0.745	0.295	-1.333	-0.156	0.0139*
Benefits						
	White	6.195	0.138	5.921	6.469	
	Non-White	6.028	0.205	5.620	6.436	
	difference	-0.167	0.245	-0.656	0.323	0.4988
Career benefits						
	White	5.322	0.139	5.045	5.600	
	Non-White	5.551	0.207	5.138	5.965	
	difference	0.229	0.249	-0.267	0.725	0.3605
Seriousness						
	White	5.181	0.152	4.878	5.484	
	Non-White	5.072	0.227	4.620	5.523	
	difference	-0.109	0.272	-0.651	0.432	0.6882
Intention						
	White	6.306	0.102	6.103	6.509	
	Non-White	6.050	0.152	5.748	6.352	
	difference	-0.256	0.182	-0.618	0.107	0.1639

Table 14: Age trend on the post test

Scale	Trend	Slope	SE	95% CI		p-value
Awareness						
	Age	0.004	0.024	-0.044	0.052	0.8618
Connectedness						
	Age	0.009	0.037	-0.064	0.082	0.7963
Normative helping behavior						
	Age	0.001	0.022	-0.043	0.045	0.9695
Costs						
	Age	0.035	0.045	-0.055	0.124	0.4437
Benefits						
	Age	0.011	0.037	-0.063	0.086	0.7625
Career benefits						
	Age	0.014	0.038	-0.061	0.090	0.7089
Seriousness						
	Age	0.008	0.041	-0.075	0.090	0.8542
Intention						
	Age	0.013	0.028	-0.043	0.068	0.6502

Table 15: Gender differences on the post test

Scale	Gender	LS Mean	SE	95% CI		p-value
Awareness						
	Female	6.317	0.105	6.108	6.526	
	Male	6.047	0.116	5.817	6.277	
	difference	-0.270	0.151	-0.572	0.032	0.0785
Connectedness						
	Female	6.079	0.159	5.762	6.395	
	Male	5.525	0.175	5.176	5.874	
	difference	-0.553	0.229	-1.011	-0.096	0.0185
Normative helping behavior						
	Female	6.196	0.096	6.005	6.387	
	Male	6.059	0.106	5.848	6.269	
	difference	-0.137	0.138	-0.413	0.138	0.3238
Costs						
	Female	4.172	0.195	3.783	4.560	
	Male	4.262	0.215	3.834	4.691	
	difference	0.091	0.281	-0.471	0.652	0.7485
Benefits						
	Female	6.308	0.162	5.986	6.631	
	Male	5.914	0.179	5.559	6.270	
	difference	-0.394	0.234	-0.860	0.072	0.0964
Career benefits						
	Female	5.706	0.164	5.379	6.033	
	Male	5.168	0.181	4.807	5.528	
	difference	-0.538	0.237	-1.011	-0.065	0.0263
Seriousness						
	Female	5.450	0.179	5.093	5.807	
	Male	4.802	0.198	4.409	5.196	
	difference	-0.648	0.259	-1.164	-0.132	0.0147
Intention						
	Female	6.228	0.120	5.988	6.467	
	Male	6.128	0.132	5.864	6.392	
	difference	-0.100	0.173	-0.445	0.246	0.5673

Table 16: Previous volunteer differences on the post test

Scale	Previous volunteer	LS Mean	SE	95% CI		p-value
Awareness						
	Yes, occasionally	6.118	0.111	5.896	6.340	
	Yes, regularly	6.246	0.106	6.035	6.458	
	difference	0.128	0.147	-0.165	0.420	0.3858
Connectedness						
	Yes, occasionally	5.746	0.169	5.410	6.082	
	Yes, regularly	5.857	0.161	5.537	6.178	
	difference	0.111	0.222	-0.332	0.554	0.6186
Normative helping behavior						
	Yes, occasionally	6.055	0.102	5.853	6.258	
	Yes, regularly	6.200	0.097	6.007	6.393	
	difference	0.145	0.134	-0.123	0.412	0.2844
Costs						
	Yes, occasionally	4.143	0.207	3.731	4.556	
	Yes, regularly	4.291	0.197	3.897	4.684	
	difference	0.147	0.273	-0.397	0.691	0.5909
Benefits						
	Yes, occasionally	6.027	0.172	5.684	6.370	
	Yes, regularly	6.196	0.164	5.869	6.523	
	difference	0.169	0.227	-0.283	0.621	0.4590
Career benefits						
	Yes, occasionally	5.294	0.174	4.946	5.641	
	Yes, regularly	5.580	0.166	5.249	5.911	
	difference	0.286	0.230	-0.171	0.744	0.2163
Seriousness						
	Yes, occasionally	4.934	0.190	4.555	5.313	
	Yes, regularly	5.319	0.181	4.957	5.680	
	difference	0.385	0.251	-0.115	0.885	0.1292
Intention						
	Yes, occasionally	6.089	0.127	5.835	6.343	
	Yes, regularly	6.267	0.121	6.025	6.509	
	difference	0.178	0.168	-0.157	0.513	0.2922

Table 17: Current volunteer differences on the post test

Scale	Current volunteer	LS Mean	SE	95% CI		p-value
Awareness						
	Yes, occasionally	6.115	0.087	5.941	6.288	
	Yes, regularly	6.250	0.134	5.982	6.517	
	difference	0.135	0.160	-0.183	0.453	0.4005
Connectedness						
	Yes, occasionally	5.621	0.132	5.358	5.884	
	Yes, regularly	5.983	0.204	5.577	6.389	
	difference	0.362	0.242	-0.120	0.844	0.1390
Normative helping behavior						
	Yes, occasionally	6.128	0.079	5.970	6.287	
	Yes, regularly	6.127	0.123	5.882	6.372	
	difference	-0.001	0.146	-0.292	0.289	0.9932
Costs						
	Yes, occasionally	4.313	0.162	3.991	4.636	
	Yes, regularly	4.121	0.250	3.623	4.618	
	difference	-0.193	0.297	-0.784	0.399	0.5178
Benefits						
	Yes, occasionally	6.044	0.134	5.776	6.312	
	Yes, regularly	6.179	0.207	5.765	6.593	
	difference	0.135	0.246	-0.356	0.626	0.5854
Career benefits						
	Yes, occasionally	5.578	0.136	5.306	5.849	
	Yes, regularly	5.296	0.210	4.877	5.715	
	difference	-0.281	0.250	-0.779	0.216	0.2634
Seriousness						
	Yes, occasionally	5.052	0.149	4.756	5.348	
	Yes, regularly	5.201	0.230	4.743	5.659	
	difference	0.149	0.273	-0.395	0.693	0.5869
Intention						
	Yes, occasionally	5.923	0.099	5.724	6.121	
	Yes, regularly	6.433	0.154	6.126	6.739	
	difference	0.510	0.183	0.146	0.874	0.0067

CHAPTER V

DISCUSSION

Introduction

This study has provided information about service-learning program's impact on senior dental students' attitude to community service and the relationship between dental students' characteristics and attitude to community service at VCU SoD in 2011-2012. To our knowledge, no published studies have examined service-learning programs' impact on senior dental students' attitude towards community service using a validated scale. This study was intended to assess the outcome of service-learning program as it became part of the formal required curriculum. It was not intended to develop a definitive model to predict dental students' community service behavior after graduation although attitude to community service is believed to likely precede community service behavior.

Study Population

This study's population was 105 senior dental students at VCU SoD (class of 2012) who participated in the service-learning program as part the required DENS762 course. The response rates of 72% for post-test and 74% for pre-test (note: only post-test respondents were invited to pre-test) were lower for a survey of dental students, but were expected since it was not possible to make participation in the survey mandatory due to the timing of the initiation of the study: the study was initiated after the course syllabus was distributed to the students. A few potential ways of incentivizing students such as extra points were considered. We decided not to provide any extra points because the course adopted a pass or fail grading scheme where students do not benefit from extra points. The PI sent three reminders with a personalized message to non-respondents to encourage them to participate. As we continue to collect data for the class of 2013 and thereafter, we revised the course syllabus to include participation in pre and post-test

surveys as part of the course and anticipate full participation from future students. This will enable the investigators to collect data from a larger sample size which would allow more flexibility in statistical analyses.

For the present study, respondent bias was examined. Respondents were similar to the entire study population in terms of age, gender, and ethnicity while there was a slightly larger proportion of female among the respondents (43%) compared to the proportion of female students among the entire class (33%). When comparing those who completed both the pre- and post-test to those who only completed the post-test, there was no difference in gender, age, or ethnicity ($P > 0.3$).

Among 105 eligible students, five were IDP students and all five of those students responded to post-test. No hypothesis testing was attempted to examine if IDP students are different in terms of community service attitudes or service-learning program's impact on their attitude because the sample size was too small and no previous literature suggested IDP students to be different from other students in community service attitude.

Aside from the required service-learning course, the vast majority of the respondents stated that they participated in voluntary not-assigned community services either regularly (22%) or occasionally (48%) during dental school as well as prior to dental school (36% regularly and 38% occasionally). The percentage of regular volunteers decreased during dental school compared to prior to dental school, presumably because they got busier with multiple responsibilities during dental school.

Survey Instrument: CSAS

This study used the CSAS survey instrument that was developed and validated by Shiarella and others as previously discussed in Chapter III (Shiarella, 2000). Several advantages of using the CSAS were considered to determine whether we develop our own survey instrument or adopt a previously developed instrument. First of all, the CSAS

is based on a conceptual framework of Schwartz's helping behavior (see Chapter II for further details about Schwartz's model). Schwartz's helping behavior model has been widely accepted and used to explain the cognitive and affective steps of helping behavior in a series of progressive steps from perception or awareness of needs to intention to the actual helping behavior. Shiarella and others developed question items corresponding to Schwartz's model's sequential steps, tested those items, and conducted a factor analysis to come up with eight CSAS scale that comprises 46 question items (Shiarella, 2000). To our knowledge, no published studies in dental education reported using CSAS and Schwartz's helping behavior framework. Holtzman and others used "Attitudes Toward Health Care" that was originally designed for medical students by Crandall and others (Holtzman & Seirawan, 2009). The CSAS survey instrument is composed of 23 statement items for four distinct domains/scales of social expectation, dentist/student responsibility, personal efficacy, and access to care which is not based on logical sequential steps to predict helping behavior such as Schwartz's model. Second, CSAS is designed to measure community service attitude towards general helping behavior that can be applied not only to health care but also to other disciplines. It allows us to compare dental students' attitude with that of students in other professional programs or other disciplines. Although it was not intended to be part of this thesis, a separate analysis to examine CSAS's applicability to dental education will be conducted after more data is collected. To meet this purpose, minimal and only necessary modifications were made to Shiarella's original CSAS instrument. The wording of the introductory paragraphs, the definition of the term "community service", and the order of the question items were maintained. Only one question (#15 in Shiarella and et al.'s article: "I would have less time for my schoolwork") was modified to "I would have less time for my work" because the original statement did not fit the context of our questionnaire: the original question asked respondents to rate how likely they feel those stated outcomes to occur

next year when the respondents indeed would graduate from dental school and have no school work.

Individual CSAS Scales

Findings in all eight CSAS scales will be discussed individually in the following section in terms of distribution of the responses and comparison of pre and post-test means in each question. For all of the eight scales, no attempts were made to combine scores to obtain percentage distribution in each scale level because of the sample size discrepancy between pre-test (57) and post-test (76). The pre and post-test percentage distributions at the question level were presented in Tables 2 to 9. Mean pre and post-test scores were calculated at the scale level as weighted average of means in each question. It should be noted that in this section discussions of individual CSAS Scales include bivariate analysis that did not consider interactions between scales. Also it should be noted that no hypothesis testing at the individual question level was attempted to avoid multiple comparisons with the small sample size of 57.

Awareness

All seven items in the awareness scale showed improvement from pre-test to post-test as shown in Figure 1. It is interesting to note that pre-test scores indicated a high level of community service attitude: pre-test means at the question level ranged from 5.34 to 6.29 that would correspond to slightly agree (5) and agree (6) using a seven-point Likert type anchor scale. It would be reasonable to say that dental students' awareness was relatively good before the service-learning program but got better after the service-learning program. Based on the bivariate analysis, both the means at the question level and the average of the means at the scale level showed improvement in the awareness scale between pre and post-test. In other words, without adjusting for the interaction between the scales and significance level (p-value) available, the service-learning

program may have impacted the awareness scale both at the individual question and at the awareness scale level.

Connectedness

All eight items in the connectedness scale showed improvement from pre-test to post-test as shown in Figure 2. It should be noted that pre-test scores indicated higher-than-neutral level of community service attitude: pre-test means at the question level ranged from 4.73 to 5.8 that would correspond to neither agree nor disagree (4), slightly agree (5) and agree (6) in a seven-point Likert type anchor scale. This is lower than the awareness scale pre-test range. It would be reasonable to say that dental students' connectedness to community needs was relatively good before the service-learning program but got better after the service-learning program. However, connectedness scale means at the question level and at the scale level were not as high as that of the awareness scale indicating that they are aware of the community needs but do not always feel they are connected to those in need. One question: "other people deserve my help" got the lowest pre-test and post-test means which apparently lowered the means at the scale level. One possible reason for the lower score in this question is that wording "deserve" may not have appealed to the respondents or even created emotional resistance to them. In the free comments, some respondents mentioned that they do not agree with a sense of entitlement that some of the underserved people displayed when the students did their rotations. The word "deserve" may have been interpreted as being the same as the term "entitlement" to a certain extent by some of the respondents.

From bivariate analysis, both the means at the question level and the average of the means at the scale level showed improvement in the connectedness scale between pre and post-test. In other words, without adjusting for the interaction between the scales and significance level (p-value) available, the service-learning program may have impacted the connectedness scale both at the individual question and at the scale level.

Normative Helping Behavior

All eleven items in the normative helping behavior scale showed improvement from pre-test to post-test as shown in Figure 3. It should be noted that pre-test scores indicated higher-than-neutral level of community service attitude: pre-test means at the question level ranged from 4.89 to 6.27 that would correspond to neither agree nor disagree (4), slightly agree (5) and agree (6) in a seven-point Likert type anchor scale. This is lower than the awareness scale pre-test range. It would be reasonable to say that dental students' normative helping behavior to community needs was relatively good before the service-learning program but got better after the service-learning program. However, the normative helping behavior scale's overall means at the question level and at the scale level were not as high as that of the awareness scale, indicating that they were aware of the community needs but did not always feel that helping to meet the needs was the social norm. One question: "volunteer work at community agencies helps solve social problems" got the lowest pre-test and post-test means which apparently lowered the means at the scale level. One possible reason for the lower scores on this question is that the word "solve" may have made the respondent disagree because the word "solve" can be considered as strong. In addition, as a senior dental student who had exposure to community needs and complexity of access to care problems, the respondents may think social problems are too complex to be solved by volunteer activities.

From bivariate analysis, both the means at the question level and the average of the means at the scale level showed improvement in the normative helping behavior scale between pre and post-test. In other words, without adjusting for the interaction between the scales and significance level (p-value) available, the service-learning program may have impacted the normative helping behavior scale both at the individual question and at the scale level.

Costs

Not all six items in the costs scale showed improvement from pre-test to post-test as shown in Figure 4. It should be noted that for the costs scale, higher scores would mean less favorable community service attitudes, the opposite of all other scales. Four question items showed a decrease in the mean score between pre and post-test while two question items showed an increase in the mean score. The increase in the mean score can be interpreted as indicating students became more realistic about costs related to community service after experiencing it. However it also should be noted that those increases were marginal and may not be significant.

Pre-test scores in the costs scale indicated higher-than-neutral level of community service attitude: pre-test means at the question level ranged from 3.86 to 4.95 that would correspond to neither likely nor unlikely (4) and slightly likely (5) in a seven-point Likert type anchor scale. Percentage distribution shows a more even distribution over the seven-point Likert scale indicating opinions about costs are likely more varied than other scales. It would be reasonable to say that dental students recognized costs related to community service before the service-learning program and became more positive about the costs after the service-learning program.

From bivariate analysis, both the means at some question level and the average of the means at the scale level showed improvement (a decrease in score) in the costs scale between pre and post-test. In other words, without adjusting for the interaction between the scales and significance level (p-value) available, the service-learning program may have impacted the costs scale both at the individual question and at the scale level.

Benefits

All four items in the benefits scale showed improvement from pre-test to post-test as shown in Figure 5. It should be noted that pre-test scores indicated a pretty high level of community service attitude: pre-test means at the question level ranged from 5.54 to

5.91 that would correspond to slightly agree (5) and agree (6) in a seven-point Likert type anchor scale. It would be reasonable to say that dental students' recognition of benefits of community service participation was relatively good before the service-learning program but got better after the service-learning program. It is interesting to see that the question "I would be developing new skills" had a marginal increase of 0.05 and had the lowest pre-test and post-test means among the four questions in this benefits scale. A common belief that service-learning rotations allow more exposures to clinical procedures that are not available in a traditional intramural student clinic was not supported in this finding. One possible explanation is that respondents may have considered "new skills" limited to more advanced clinical techniques such as extensive reconstructive dentistry which many community clinics do not afford. From bivariate analysis, both the means at the question level and the average of the means at the scale level showed improvement in the benefits scale between pre and post-test. In other words, without adjusting for the interaction between the scales and significance level (p-value) available, the service-learning program may have impacted the benefits scale both at the individual question and at the scale level.

Career Benefits

Both items in the career benefits scale showed improvement from pre-test to post-test as shown in Figure 6. It is interesting to see that the question "I would make valuable contacts for my professional career" had a lower pre-test mean of 4.66 (4 is corresponding to "neither likely nor unlikely" and 5 corresponding to "slightly likely") but increased to 5.29 post-test indicating service-learning may have impacted students to realize career benefits from community service that they did not think about before their service-learning rotations. From bivariate analysis, both the means at the question level and the average of the means at the scale level showed improvement in the career benefits scale between pre and post-test. In other words, without adjusting for the

interaction between the scales and significance level (p-value) available, the service-learning program may have impacted the career benefits scale both at the individual question and at the scale level.

Seriousness

All five items in the seriousness scale showed improvement from pre-test to post-test as shown in Figure 7. It should be noted that pre-test scores indicated neutral to slightly high level of seriousness: pre-test means at the question level ranged from 3.68 to 5.52 that would correspond to slightly disagree (3) and slightly agree (5) in a seven-point Likert type anchor scale. It would be reasonable to say that dental students' level of seriousness to community service participation was mixed before the service-learning program but got better after the service-learning program. The question "Without community service, today's disadvantaged citizens have no hope" had the lowest pre-test mean of 3.68 (3 corresponds to "slightly disagree") but increased to 3.84 post-test indicating service-learning may have marginally impacted students to become more serious about community service. From bivariate analysis, both the means at the question level and the average of the means at the scale level showed improvement in the seriousness benefits scale between pre and post-test. In other words, without adjusting for the interaction between the scales and significance level (p-value) available, the service-learning program may have impacted the seriousness benefits scale both at the individual question and at the scale level.

Intention

All three items in the intention scale showed improvement from pre-test to post-test as shown in Figure 8. It should be noted that pre-test scores indicated higher level of intention: pre-test means at the question level ranged from 5.45 to 6.05 that would correspond to slightly agree (5) and agree (6) in a seven-point Likert type anchor scale. It would be reasonable to say that dental students' level of intention to community service

participation was relatively high before the service-learning program but got better after the service-learning program. The question “I want to do this activity” had a lowest pre-test mean of 5.45 (5 corresponds to “agree”) among three items but increased to 6.11 post-test indicating service-learning may have positively impacted students more likely to develop intention to provide community service. From bivariate analysis, both the means at the question level and the average of the means at the scale level showed improvement in the intention scale between pre and post-test. In other words, without adjusting for the interaction between the scales and significance level (p-value) available, the service-learning program may have impacted the intention scale both at the individual question and at the scale level.

Correlation between the Scales

It is not surprising that most Pearson correlations between the scales were found to be statistically significant (Table 10). Intuitively, scales that are theoretically designed to progress in a sequential way would move in the same direction. For example, respondents who scored high in the awareness scale (first step in Schwartz’s model) would score high in the connectedness scale (second step in Schwartz’s model), as was found in the study as the Pearson correlation was 0.71 (p-value < 0.005). Since the costs scale had opposite direction compared to other scales, correlations between costs scale and other scales presumably should be negative. However, in fact, four pairs (costs to connectedness, normative helping behavior, seriousness, and intention) had a negative correlation as expected but other pairs (costs to awareness, benefits, career benefits) had a positive correlation. Only two of these correlations (costs to benefits and costs to seriousness) were statistically significant. This mixture makes interpretation difficult and tricky. However, after we considered that Pearson correlations can examine only linear relationships and that the correlations are not very relevant to the project’s purpose, no further advanced analysis regarding correlations was conducted.

Service-learning's Impact on Students' Attitude to Community Service

To answer this project's main question "Did service-learning impact dental students' attitude to community service?" a repeated-measure mixed-model ANOVA was conducted for eight CSAS scales. The overall F test was significant indicating that there was a change between pre and post-test. While LS means for all eight scales improved between pre and post-test, after adjusting for scales effect, only five scales showed statistically significant level of change: scales of connectedness, normative helping behavior, benefits, career benefits, and intention. This change indicates within subject effect (random effect) by occasion/time. In other words, we can state service-learning program positively impacted dental students' attitudes to community service and its impact did not depend on scale (p-value for interaction time*scale was insignificant). In general, the attitude scores over the eight scales were pretty high in pre-test. The post-test scores improved in all eight scales and the LS means changes ranged from 0.133 to 0.374. Five scales showed a statistically significant improvement. From the perspective of magnitude in change, one might interpret these changes as "modest" and not "dramatic." One possible reason for this "modest" change is that we used a mean score change for each scale rather than a total score in each scale which would make the raw changes look larger. In addition, high pre-test attitude scores may have contributed to make the changes appear smaller due to the ceiling effect.

This study's findings can be compared to those of Holtzman et al.'s study where the authors found evidence for a significant decrease in some scales and no evidence for a significant change in other scales in freshmen dental students' attitudes toward caring for the underserved before, during, and after community-based dental program (Holtzman & Seirawan, 2009). One possible explanation is that in Holtzman et al's study, the study population was freshmen dental students who may have idealistic attitudes in the beginning but become more realistic which may appear as lower attitude scores in the

survey. The other explanation of Holtzman's study findings would be the community based dental program of two-half-day duration was fairly short to reasonably believe that it would change students' attitudes.

Relationship between Student Characteristics and Attitude to Community Service

To answer this project's second question "Are there any relationship between student characteristics and attitude to community service" a repeated-measure mixed-model ANOVA was conducted to analyze post-test data. It should be noted that the intention of this second aim was to simply assess the possibility that other factors other than the service-learning program significantly affected or were associated with students' attitude to community service. Among age, gender, ethnicity, previous and current volunteer activities, only ethnicity (White vs. non-White) had a significant p-value of 0.0454 across all scales (Table 12). Ethnicity differences tested on all eight scales found significance only with the costs scale. White respondents were found to be more cognizant to the costs related to community service. One possible explanation is that White students may be more likely to finance their education independently and depend on student loans than non-White students (mainly Asian students which comprised 26 of 30 non-White respondents) who may be more likely to have family support due to culture. In this way, White students with large loans would be more likely to be cognizant of costs. However, even for the White and non-White comparison in the costs scale, the p-value was 0.0139 which can be considered significant at a=0.05 level but would not be considered significant after Bonferroni adjustment for multiple comparisons. This finding is consistent with Holtzman et al.'s study and Kuthy et al.'s study which did not find significant differences in students' attitudes by age, gender, or volunteer experience (Holtzman & Seirawan, 2009)(Kuthy et al., 2007).

Students' Comments to Service-learning Program

Eleven respondents provided comments to service-learning program as well as other community-related activities. Comments were mainly about how the program can be better coordinated to be student friendly. Specifically, comments indicated that students had to sacrifice a lot of their personal time and sometimes had to risk their own well-being. These comments provided good insights about how community dental programs or public health programs can be improved to increase provider participation. Given only one of 76 respondents indicated that they were not interested in community service, the vast majority of senior dental students indicated that they were interested in community service, but indicated that they faced several barriers such as time and money. When the senior dental students become practicing dentists, they can choose whether or not they want to do community service. If community dental programs do not improve on coordinating provider activities and making the programs provider-friendly (i.e. incorporating periodic breaks), they may not be able to recruit a sufficient number of providers to sustain their programs. In other words, the responsibility for maintaining robust community dental programs lies not only with dentists and dental personnel, but with the communities themselves.

Limitations of the Study and Suggestions for Future Research

There are some limitations of this study. First, this study had small sample size: 57 for the pre-test and 76 for the post-test. This small sample size did not allow us to perform multiple comparisons with enough confidence nor to assess application of Shiarella's CSAS to dental education by comparing our findings to Shiarella's findings. As we continue to collect data for coming years, we will be able to examine dental students' attitude to community service from more perspectives with higher statistical confidence. A larger sample size will also allow us to assess CSAS's application to dental

education and disseminate its use to dental education as well as other healthcare disciplines if it is found to be useful. This will allow investigators to compare different schools, programs, and disciplines. With an emerging trend of emphasizing inter-professional education, CSAS can help educators to evaluate their program and benefit educators as well as students. Second, this study adopted RTP (retrospective pre-test) rather than traditional pre-test then post-test design. One potential bias of RTP is the overestimation of program effect (Hill, 2005). Although this study found modestly positive impact of service-learning on students' attitude to community service, it may have been overestimated. When we continue to collect data for next year with traditional pre-test and post-test, we can compare RTP with traditional way to examine overestimation occurred. Third, this study examined service-learning program at a particular dental school. Other dental schools may have their service-learning program structured in a very different way that VCU School of Dentistry that would affect the program's impact on students' attitude and limit generalizability of this study's findings. Future research can examine how different service-learning/community-based dental education program structures impact dental students' attitudes and develop a gold standard or the best practice that would maximize students' outcomes. Fourth, even if students' attitude towards community service is believed to be a predictor for their actual behavior and service-learning program has impacted students' attitude, it is premature to conclude that a service-learning program can impact community service behavior when students become practicing dentists. Future research can follow up with these dentists to examine what impact the service-learning program made related to community service after graduation.

Summary and Clinical Implication

The main findings of this study can be summarized as follows: The service-learning program at VCU School of Dentistry in 2011-2012 has positively impacted

senior dental students' attitude towards community service as measured with CSAS. More specifically, scales such as connectedness, normative helping behavior, benefits, career benefits, and intention showed significant pre and post-test differences. Relationships between student characteristics such as age, gender, ethnicity, and previous and current volunteer activities and students' attitudes to community service were examined, but were not found to be statistically significant.

Dental educators and administrators of service-learning programs in dental schools can use this study's findings as an example of one of the service-learning program's outcomes: improving dental students' attitude to community service. They can also apply the tool of CSAS to evaluate their service-learning program's impact and compare their findings to this study's findings or between different programs to make students' experience with service-learning better.

APPENDIX A

E-MAIL INVITATIONS

E-mail Invitation (Survey 1)

We would like to invite you to participate in a research study regarding service-learning and community service. This study consists of **two sets of surveys** that are to be conducted a few weeks apart. If you agree to participate, we ask that you follow the link below and complete the first questionnaire. The second questionnaire will be distributed a few weeks later.

We estimate that it will take approximately 10 - 15 minutes to complete it. You are free to skip any questions that you prefer not to answer.

Taking part in this research study is completely voluntary and not related to the DENS 762 course. We will keep the information you provide confidential. An ID code number will be used for matching purpose.

If you have any questions about the research study itself, please contact the principal investigator, Dr. Kim, at the Department of General Practice, at (804) 828-2977 or mjkim@vcu.edu. If you have questions about the rights of research subjects, please contact the VCU Office of Research Subjects Protection, (804) 828-0868, or ORSP@vcu.edu.

Thank you very much for your consideration. Completing this survey indicates your willingness to participate in the study.

E-mail Invitation (Survey 2)

We would like to invite you to participate in a research study regarding service-learning and community service. This is the **second questionnaire** of the two sets of surveys. If you agree to participate, we ask that you follow the link below and complete the second questionnaire.

We estimate that it will take approximately 10 - 15 minutes to complete it. You are free to skip any questions that you prefer not to answer.

Taking part in this research study is completely voluntary and not related to the DENS 762 course. We will keep the information you provide confidential. An ID code number will be used for matching purpose.

Thank you very much for your consideration. Completing this online survey indicates your willingness to participate in the study.

APPENDIX B

SURVEY 1: POST-TEST

Confidential

Service-learning: Survey 1 (version 1: Feb. 17, 2012)

We are trying to understand your willingness to donate your time regularly to community service after graduation. By community service, we mean a project in which you would volunteer regularly and use your skills and knowledge in dentistry. These types of community service require a commitment and offer you the opportunity to share your skills as well as develop new ones. Examples include participating in MOM (Missions of Mercy) projects, Give Kids a Smile, and/or providing uncompensated care to underserved populations.

Please answer the following questions about your feelings regarding community service projects using the definition above. Some of the questions might appear similar, but please answer all of them. If a question does not apply to you, please skip the question.

Now, pretend you are going to volunteer for a community service project sometime in the next year. Questions below ask you about possible outcomes of volunteering. Use the following scale to rate how likely you feel these outcomes are to occur.

1) I would be contributing to the betterment of the community.

- ☐ Extremely unlikely
- ☐ Quite unlikely
- ☐ Slightly unlikely
- ☐ Neither likely nor unlikely
- ☐ Slightly likely
- ☐ Quite likely
- ☐ Extremely likely

2) I would experience personal satisfaction knowing that I am helping others.

- ☐ Extremely unlikely
- ☐ Quite unlikely
- ☐ Slightly unlikely
- ☐ Neither likely nor unlikely
- ☐ Slightly likely
- ☐ Quite likely
- ☐ Extremely likely

3) I would be meeting other people who enjoy community service.

- ☐ Extremely unlikely
- ☐ Quite unlikely
- ☐ Slightly unlikely
- ☐ Neither likely nor unlikely
- ☐ Slightly likely
- ☐ Quite likely
- ☐ Extremely likely

4) I would be developing new skills.

- ☐ Extremely unlikely
- ☐ Quite unlikely
- ☐ Slightly unlikely
- ☐ Neither likely nor unlikely
- ☐ Slightly likely
- ☐ Quite likely
- ☐ Extremely likely

5) I would make valuable contacts for my professional career.

- ☐ Extremely unlikely
- ☐ Quite unlikely
- ☐ Slightly unlikely
- ☐ Neither likely nor unlikely
- ☐ Slightly likely
- ☐ Quite likely
- ☐ Extremely likely

6) I would gain valuable experience for my resume.

- ☐ Extremely unlikely
- ☐ Quite unlikely
- ☐ Slightly unlikely
- ☐ Neither likely nor unlikely
- ☐ Slightly likely
- ☐ Quite likely
- ☐ Extremely likely

7) I would have less time for my work.

- ☐ Extremely unlikely
- ☐ Quite unlikely
- ☐ Slightly unlikely
- ☐ Neither likely nor unlikely
- ☐ Slightly likely
- ☐ Quite likely
- ☐ Extremely likely

8) I would have forgone the opportunity to make money in a paid position.

- ☐ Extremely unlikely
- ☐ Quite unlikely
- ☐ Slightly unlikely
- ☐ Neither likely nor unlikely
- ☐ Slightly likely
- ☐ Quite likely
- ☐ Extremely likely

9) I would have less energy.

- ☐ Extremely unlikely
- ☐ Quite unlikely
- ☐ Slightly unlikely
- ☐ Neither likely nor unlikely
- ☐ Slightly likely
- ☐ Quite likely
- ☐ Extremely likely

10) I would have less time to work.

- ☐ Extremely unlikely
- ☐ Quite unlikely
- ☐ Slightly unlikely
- ☐ Neither likely nor unlikely
- ☐ Slightly likely
- ☐ Quite likely
- ☐ Extremely likely

11) I would have less free time.

- ☐ Extremely unlikely
- ☐ Quite unlikely
- ☐ Slightly unlikely
- ☐ Neither likely nor unlikely
- ☐ Slightly likely
- ☐ Quite likely
- ☐ Extremely likely

12) I would have less time to spend with my family.

- ☐ Extremely unlikely
- ☐ Quite unlikely
- ☐ Slightly unlikely
- ☐ Neither likely nor unlikely
- ☐ Slightly likely
- ☐ Quite likely
- ☐ Extremely likely

Now, pretend you are going to volunteer for a community service project sometime in the next year. Use the following scale to rate how much you would agree with the following.

13) I want to do this activity.

- ☐ Strongly disagree
- ☐ Disagree
- ☐ Slightly disagree
- ☐ Neither agree nor disagree
- ☐ Slightly agree
- ☐ Agree
- ☐ Strongly agree

14) Community groups need our help.

- ☐ Strongly disagree
- ☐ Disagree
- ☐ Slightly disagree
- ☐ Neither agree nor disagree
- ☐ Slightly agree
- ☐ Agree
- ☐ Strongly agree

15) It is important to help people in general.

- ☐ Strongly disagree
- ☐ Disagree
- ☐ Slightly disagree
- ☐ Neither agree nor disagree
- ☐ Slightly agree
- ☐ Agree
- ☐ Strongly agree

16) Improving communities is important to maintaining a quality society.

- ☐ Strongly disagree
- ☐ Disagree
- ☐ Slightly disagree
- ☐ Neither agree nor disagree
- ☐ Slightly agree
- ☐ Agree
- ☐ Strongly agree

17) I can make a difference in the community.

- ☐ Strongly disagree
- ☐ Disagree
- ☐ Slightly disagree
- ☐ Neither agree nor disagree
- ☐ Slightly agree
- ☐ Agree
- ☐ Strongly agree

18) Our community needs good volunteers.

- ☐ Strongly disagree
- ☐ Disagree
- ☐ Slightly disagree
- ☐ Neither agree nor disagree
- ☐ Slightly agree
- ☐ Agree
- ☐ Strongly agree

19) There are people in the community who need help.

- ☐ Strongly disagree
- ☐ Disagree
- ☐ Slightly disagree
- ☐ Neither agree nor disagree
- ☐ Slightly agree
- ☐ Agree
- ☐ Strongly agree

20) All communities need good volunteers.

- ☐ Strongly disagree
- ☐ Disagree
- ☐ Slightly disagree
- ☐ Neither agree nor disagree
- ☐ Slightly agree
- ☐ Agree
- ☐ Strongly agree

21) Volunteer work at community agencies helps solve social problems.

- ☐ Strongly disagree
- ☐ Disagree
- ☐ Slightly disagree
- ☐ Neither agree nor disagree
- ☐ Slightly agree
- ☐ Agree
- ☐ Strongly agree

22) Volunteers in community agencies make a difference, if only a small difference.

- ☐ Strongly disagree
- ☐ Disagree
- ☐ Slightly disagree
- ☐ Neither agree nor disagree
- ☐ Slightly agree
- ☐ Agree
- ☐ Strongly agree

23) College student volunteers can help improve the local community.

- ☐ Strongly disagree
- ☐ Disagree
- ☐ Slightly disagree
- ☐ Neither agree nor disagree
- ☐ Slightly agree
- ☐ Agree
- ☐ Strongly agree

24) Volunteering in community projects can greatly enhance the community's resources.

- ☐ Strongly disagree
- ☐ Disagree
- ☐ Slightly disagree
- ☐ Neither agree nor disagree
- ☐ Slightly agree
- ☐ Agree
- ☐ Strongly agree

25) I am responsible for doing something about improving the community.

- ☐ Strongly disagree
- ☐ Disagree
- ☐ Slightly disagree
- ☐ Neither agree nor disagree
- ☐ Slightly agree
- ☐ Agree
- ☐ Strongly agree

26) Contributing my skills will make the community a better place.

- ☐ Strongly disagree
- ☐ Disagree
- ☐ Slightly disagree
- ☐ Neither agree nor disagree
- ☐ Slightly agree
- ☐ Agree
- ☐ Strongly agree

27) It is my responsibility to take some real measures to help others in need.

- ☐ Strongly disagree
- ☐ Disagree
- ☐ Slightly disagree
- ☐ Neither agree nor disagree
- ☐ Slightly agree
- ☐ Agree
- ☐ Strongly agree

28) It is important to provide a useful service to the community through community service.

- ☐ Strongly disagree
- ☐ Disagree
- ☐ Slightly disagree
- ☐ Neither agree nor disagree
- ☐ Slightly agree
- ☐ Agree
- ☐ Strongly agree

29) It is important to me to have a sense of contribution and helpfulness through participating in community service.

- ☐ Strongly disagree
- ☐ Disagree
- ☐ Slightly disagree
- ☐ Neither agree nor disagree
- ☐ Slightly agree
- ☐ Agree
- ☐ Strongly agree

30) It is important to me to gain an increased sense of responsibility from participating in community service.

- ☐ Strongly disagree
- ☐ Disagree
- ☐ Slightly disagree
- ☐ Neither agree nor disagree
- ☐ Slightly agree
- ☐ Agree
- ☐ Strongly agree

31) When I meet people who are having a difficult time, I wonder how I would feel if I were in their shoes.

- ☐ Strongly disagree
- ☐ Disagree
- ☐ Slightly disagree
- ☐ Neither agree nor disagree
- ☐ Slightly agree
- ☐ Agree
- ☐ Strongly agree

32) I will participate in a community service project in the next year.

- ☐ Strongly disagree
- ☐ Disagree
- ☐ Slightly disagree
- ☐ Neither agree nor disagree
- ☐ Slightly agree
- ☐ Agree
- ☐ Strongly agree

33) I feel bad that some community members are suffering from a lack of resources.

- ☐ Strongly disagree
- ☐ Disagree
- ☐ Slightly disagree
- ☐ Neither agree nor disagree
- ☐ Slightly agree
- ☐ Agree
- ☐ Strongly agree

34) I feel bad about the disparity among community members.

- ☐ Strongly disagree
- ☐ Disagree
- ☐ Slightly disagree
- ☐ Neither agree nor disagree
- ☐ Slightly agree
- ☐ Agree
- ☐ Strongly agree

35) I feel an obligation to contibute to the community.

- ☐ Strongly disagree
- ☐ Disagree
- ☐ Slightly disagree
- ☐ Neither agree nor disagree
- ☐ Slightly agree
- ☐ Agree
- ☐ Strongly agree

36) There are needs in the community.

- ☐ Strongly disagree
- ☐ Disagree
- ☐ Slightly disagree
- ☐ Neither agree nor disagree
- ☐ Slightly agree
- ☐ Agree
- ☐ Strongly agree

37) Lack of participation in community service will cause severe damage to our society.

- ☐ Strongly disagree
- ☐ Disagree
- ☐ Slightly disagree
- ☐ Neither agree nor disagree
- ☐ Slightly agree
- ☐ Agree
- ☐ Strongly agree

38) Without community service, today's disadvataged citizens have no hope.

- ☐ Strongly disagree
- ☐ Disagree
- ☐ Slightly disagree
- ☐ Neither agree nor disagree
- ☐ Slightly agree
- ☐ Agree
- ☐ Strongly agree

39) Other people deserve my help.

- ☐ Strongly disagree
- ☐ Disagree
- ☐ Slightly disagree
- ☐ Neither agree nor disagree
- ☐ Slightly agree
- ☐ Agree
- ☐ Strongly agree

40) Community service is necessary to making our communities better.

- ☐ Strongly disagree
- ☐ Disagree
- ☐ Slightly disagree
- ☐ Neither agree nor disagree
- ☐ Slightly agree
- ☐ Agree
- ☐ Strongly agree

41) It is critical that citizens become involved in helping their communities.

- ☐ Strongly disagree
- ☐ Disagree
- ☐ Slightly disagree
- ☐ Neither agree nor disagree
- ☐ Slightly agree
- ☐ Agree
- ☐ Strongly agree

42) Community service is a crucial component of the solution to community problems.

- ☐ Strongly disagree
- ☐ Disagree
- ☐ Slightly disagree
- ☐ Neither agree nor disagree
- ☐ Slightly agree
- ☐ Agree
- ☐ Strongly agree

Almost done. Use the following scale to rate how much you would agree with the following.

43) The more people who help, the better things will get.

- ☐ Strongly disagree
- ☐ Disagree
- ☐ Slightly disagree
- ☐ Neither agree nor disagree
- ☐ Slightly agree
- ☐ Agree
- ☐ Strongly agree

44) There are people who have needs which are not being met.

- ☐ Strongly disagree
- ☐ Disagree
- ☐ Slightly disagree
- ☐ Neither agree nor disagree
- ☐ Slightly agree
- ☐ Agree
- ☐ Strongly agree

45) My contribution to the community will make a real difference.

- ☐ Strongly disagree
- ☐ Disagree
- ☐ Slightly disagree
- ☐ Neither agree nor disagree
- ☐ Slightly agree
- ☐ Agree
- ☐ Strongly agree

46) Would you seek out an opportunity to do community service in the next year?

- ☐ Strongly disagree
- ☐ Disagree
- ☐ Slightly disagree
- ☐ Neither agree nor disagree
- ☐ Slightly agree
- ☐ Agree
- ☐ Strongly agree

For the following questions, please respond based on your exposure to the pediatric population during your service-learning experience. For these questions, the pediatric population is defined as anyone between the ages of 0 and 13 years.

47) During your service-learning rotations, how many patients (approximately) did you treat that were 0-13 years old?

- ☐ None
- ☐ 1-5
- ☐ 6-10
- ☐ 11-15
- ☐ 16+

48) The children (0-13 years old) you treated during your service-learning rotations had:

- ☐ No caries
- ☐ Mild caries (1-2 teeth)
- ☐ Moderate caries (3-6 teeth)
- ☐ Severe caries (>6 teeth)

49) Of those children, how many were 0 to 3 years old?

- ☐ None
- ☐ 1-5
- ☐ 6-10
- ☐ 11-15
- ☐ 16+

50) During your service-learning rotations, I gained experience in performing the following treatments on pediatric patients. Check all that apply.

- ☐ Exam, prophylaxis and fluoride treatment
- ☐ Sealants
- ☐ Local anesthesia
- ☐ Simple restorative
- ☐ Stainless steel crowns
- ☐ Pulp therapy
- ☐ Extractions

51) Has your service-learning experience made you feel more confident treating the pediatric population? (Y/N)

- ☐ Yes
- ☐ No

52) What are your expectations for the level of experience you should gain in treating children (0-13 years) during your service-learning rotations? Check all that apply.

- ☐ Diagnosis and treatment planning
- ☐ Sealants
- ☐ Restorative care
- ☐ Behavior management
- ☐ I do not plan to treat children in my practice

Now we would like to ask some questions about you.

53) What is your gender?

- ☐ Female
- ☐ Male

54) How old are you in years?

_____

55) Ethnicity, check all that apply:

- ☐ White
- ☐ Black, African American
- ☐ Hispanic, Latino, or Spanish Origin
- ☐ American Indian or Alaska Native
- ☐ Asian or Pacific Islander

56) Prior to dental school, did you do community or volunteer work?

- ☐ Yes, regularly
- ☐ Yes, occasionally
- ☐ No

57) During dental school, did you participate in volunteer community service activity (not assigned) outside the dental school curriculum? This can be related to dentistry or not.

- ☐ Yes, regularly
- ☐ Yes, occasionally
- ☐ No

58) What is the biggest barrier to provide community service as a practicing dentist?

- ☐ Money: I have loans to pay for.
- ☐ Time: I would not have extra time for community service.
- ☐ Interest: I am not interested in community service.

59) Please add any other comments you have about your service-learning experiences.

Press the SUBMIT button below.
Thank you for your help in understanding service-learning and community service!

APPENDIX C

SURVEY 2: PRE-TEST

Confidential

Service-learning: Survey 2 (version 1: Feb. 17, 2012)

We are trying to understand your willingness to donate your time regularly to community service after graduation. By community service, we mean a project in which you would volunteer regularly and use your skills and knowledge in dentistry. These types of community service require a commitment and offer you the opportunity to share your skills as well as develop new ones. Examples include participating in MOM (Missions of Mercy) projects, Give Kids a Smile, and/or providing uncompensated care to underserved populations.

Please answer the following questions about your feelings regarding community service BEFORE the service-learning rotations using the definition above. Some of the questions might appear similar, but please answer all of them.

Now, pretend you are going to volunteer for a community service project sometime in the next year. Questions below ask you about possible outcomes of volunteering. Use the following scale to rate how likely you FELT or WOULD'VE FELT these outcomes are to occur BEFORE your service-learning rotations.

1) I would be contributing to the betterment of the community.

- ☐ Extremely unlikely
- ☐ Quite unlikely
- ☐ Slightly unlikely
- ☐ Neither likely nor unlikely
- ☐ Slightly likely
- ☐ Quite likely
- ☐ Extremely likely

2) I would experience personal satisfaction knowing that I am helping others.

- ☐ Extremely unlikely
- ☐ Quite unlikely
- ☐ Slightly unlikely
- ☐ Neither likely nor unlikely
- ☐ Slightly likely
- ☐ Quite likely
- ☐ Extremely likely

3) I would be meeting other people who enjoy community service.

- ☐ Extremely unlikely
- ☐ Quite unlikely
- ☐ Slightly unlikely
- ☐ Neither likely nor unlikely
- ☐ Slightly likely
- ☐ Quite likely
- ☐ Extremely likely

4) I would be developing new skills.

- ☐ Extremely unlikely
- ☐ Quite unlikely
- ☐ Slightly unlikely
- ☐ Neither likely nor unlikely
- ☐ Slightly likely
- ☐ Quite likely
- ☐ Extremely likely

5) I would make valuable contacts for my professional career.

- ☐ Extremely unlikely
- ☐ Quite unlikely
- ☐ Slightly unlikely
- ☐ Neither likely nor unlikely
- ☐ Slightly likely
- ☐ Quite likely
- ☐ Extremely likely

6) I would gain valuable experience for my resume.

- ☐ Extremely unlikely
- ☐ Quite unlikely
- ☐ Slightly unlikely
- ☐ Neither likely nor unlikely
- ☐ Slightly likely
- ☐ Quite likely
- ☐ Extremely likely

7) I would have less time for my work.

- ☐ Extremely unlikely
- ☐ Quite unlikely
- ☐ Slightly unlikely
- ☐ Neither likely nor unlikely
- ☐ Slightly likely
- ☐ Quite likely
- ☐ Extremely likely

8) I would have forgone the opportunity to make money in a paid position.

- ☐ Extremely unlikely
- ☐ Quite unlikely
- ☐ Slightly unlikely
- ☐ Neither likely nor unlikely
- ☐ Slightly likely
- ☐ Quite likely
- ☐ Extremely likely

9) I would have less energy.

- ☐ Extremely unlikely
- ☐ Quite unlikely
- ☐ Slightly unlikely
- ☐ Neither likely nor unlikely
- ☐ Slightly likely
- ☐ Quite likely
- ☐ Extremely likely

10) I would have less time to work.

- ☐ Extremely unlikely
- ☐ Quite unlikely
- ☐ Slightly unlikely
- ☐ Neither likely nor unlikely
- ☐ Slightly likely
- ☐ Quite likely
- ☐ Extremely likely

11) I would have less free time.

- ☐ Extremely unlikely
- ☐ Quite unlikely
- ☐ Slightly unlikely
- ☐ Neither likely nor unlikely
- ☐ Slightly likely
- ☐ Quite likely
- ☐ Extremely likely

12) I would have less time to spend with my family.

- ☐ Extremely unlikely
- ☐ Quite unlikely
- ☐ Slightly unlikely
- ☐ Neither likely nor unlikely
- ☐ Slightly likely
- ☐ Quite likely
- ☐ Extremely likely

Now, pretend you are going to volunteer for a community service project sometime in the next year. Use the following scale to rate how much you AGREED or WOULD'VE AGREED with the following BEFORE your service-learning rotations.

13) I want to do this activity.

- ☐ Strongly disagree
- ☐ Disagree
- ☐ Slightly disagree
- ☐ Neither agree nor disagree
- ☐ Slightly agree
- ☐ Agree
- ☐ Strongly agree

14) Community groups need our help.

- ☐ Strongly disagree
- ☐ Disagree
- ☐ Slightly disagree
- ☐ Neither agree nor disagree
- ☐ Slightly agree
- ☐ Agree
- ☐ Strongly agree

15) It is important to help people in general.

- ☐ Strongly disagree
- ☐ Disagree
- ☐ Slightly disagree
- ☐ Neither agree nor disagree
- ☐ Slightly agree
- ☐ Agree
- ☐ Strongly agree

16) Improving communities is important to maintaining a quality society.

- ☐ Strongly disagree
- ☐ Disagree
- ☐ Slightly disagree
- ☐ Neither agree nor disagree
- ☐ Slightly agree
- ☐ Agree
- ☐ Strongly agree

17) I can make a difference in the community.

- ☐ Strongly disagree
- ☐ Disagree
- ☐ Slightly disagree
- ☐ Neither agree nor disagree
- ☐ Slightly agree
- ☐ Agree
- ☐ Strongly agree

18) Our community needs good volunteers.

- ☐ Strongly disagree
- ☐ Disagree
- ☐ Slightly disagree
- ☐ Neither agree nor disagree
- ☐ Slightly agree
- ☐ Agree
- ☐ Strongly agree

19) There are people in the community who need help.

- ☐ Strongly disagree
- ☐ Disagree
- ☐ Slightly disagree
- ☐ Neither agree nor disagree
- ☐ Slightly agree
- ☐ Agree
- ☐ Strongly agree

20) All communities need good volunteers.

- ☐ Strongly disagree
- ☐ Disagree
- ☐ Slightly disagree
- ☐ Neither agree nor disagree
- ☐ Slightly agree
- ☐ Agree
- ☐ Strongly agree

21) Volunteer work at community agencies helps solve social problems.

- ☐ Strongly disagree
- ☐ Disagree
- ☐ Slightly disagree
- ☐ Neither agree nor disagree
- ☐ Slightly agree
- ☐ Agree
- ☐ Strongly agree

22) Volunteers in community agencies make a difference, if only a small difference.

- ☐ Strongly disagree
- ☐ Disagree
- ☐ Slightly disagree
- ☐ Neither agree nor disagree
- ☐ Slightly agree
- ☐ Agree
- ☐ Strongly agree

23) College student volunteers can help improve the local community.

- ☐ Strongly disagree
- ☐ Disagree
- ☐ Slightly disagree
- ☐ Neither agree nor disagree
- ☐ Slightly agree
- ☐ Agree
- ☐ Strongly agree

24) Volunteering in community projects can greatly enhance the community's resources.

- ☐ Strongly disagree
- ☐ Disagree
- ☐ Slightly disagree
- ☐ Neither agree nor disagree
- ☐ Slightly agree
- ☐ Agree
- ☐ Strongly agree

25) I am responsible for doing something about improving the community.

- ☐ Strongly disagree
- ☐ Disagree
- ☐ Slightly disagree
- ☐ Neither agree nor disagree
- ☐ Slightly agree
- ☐ Agree
- ☐ Strongly agree

26) Contributing my skills will make the community a better place.

- ☐ Strongly disagree
- ☐ Disagree
- ☐ Slightly disagree
- ☐ Neither agree nor disagree
- ☐ Slightly agree
- ☐ Agree
- ☐ Strongly agree

27) It is my responsibility to take some real measures to help others in need.

- ☐ Strongly disagree
- ☐ Disagree
- ☐ Slightly disagree
- ☐ Neither agree nor disagree
- ☐ Slightly agree
- ☐ Agree
- ☐ Strongly agree

28) It is important to provide a useful service to the community through community service.

- ☐ Strongly disagree
- ☐ Disagree
- ☐ Slightly disagree
- ☐ Neither agree nor disagree
- ☐ Slightly agree
- ☐ Agree
- ☐ Strongly agree

29) It is important to me to have a sense of contribution and helpfulness through participating in community service.

- ☐ Strongly disagree
- ☐ Disagree
- ☐ Slightly disagree
- ☐ Neither agree nor disagree
- ☐ Slightly agree
- ☐ Agree
- ☐ Strongly agree

30) It is important to me to gain an increased sense of responsibility from participating in community service.

- ☐ Strongly disagree
- ☐ Disagree
- ☐ Slightly disagree
- ☐ Neither agree nor disagree
- ☐ Slightly agree
- ☐ Agree
- ☐ Strongly agree

31) When I meet people who are having a difficult time, I wonder how I would feel if I were in their shoes.

- ☐ Strongly disagree
- ☐ Disagree
- ☐ Slightly disagree
- ☐ Neither agree nor disagree
- ☐ Slightly agree
- ☐ Agree
- ☐ Strongly agree

32) I will participate in a community service project in the next year.

- ☐ Strongly disagree
- ☐ Disagree
- ☐ Slightly disagree
- ☐ Neither agree nor disagree
- ☐ Slightly agree
- ☐ Agree
- ☐ Strongly agree

33) I feel bad that some community members are suffering from a lack of resources.

- ☐ Strongly disagree
- ☐ Disagree
- ☐ Slightly disagree
- ☐ Neither agree nor disagree
- ☐ Slightly agree
- ☐ Agree
- ☐ Strongly agree

34) I feel bad about the disparity among community members.

- ☐ Strongly disagree
- ☐ Disagree
- ☐ Slightly disagree
- ☐ Neither agree nor disagree
- ☐ Slightly agree
- ☐ Agree
- ☐ Strongly agree

35) I feel an obligation to contibute to the community.

- ☐ Strongly disagree
- ☐ Disagree
- ☐ Slightly disagree
- ☐ Neither agree nor disagree
- ☐ Slightly agree
- ☐ Agree
- ☐ Strongly agree

36) There are needs in the community.

- ☐ Strongly disagree
- ☐ Disagree
- ☐ Slightly disagree
- ☐ Neither agree nor disagree
- ☐ Slightly agree
- ☐ Agree
- ☐ Strongly agree

37) Lack of participation in community service will cause severe damage to our society.

- ☐ Strongly disagree
- ☐ Disagree
- ☐ Slightly disagree
- ☐ Neither agree nor disagree
- ☐ Slightly agree
- ☐ Agree
- ☐ Strongly agree

38) Without community service, today's disadvataged citizens have no hope.

- ☐ Strongly disagree
- ☐ Disagree
- ☐ Slightly disagree
- ☐ Neither agree nor disagree
- ☐ Slightly agree
- ☐ Agree
- ☐ Strongly agree

39) Other people deserve my help.

- ☐ Strongly disagree
- ☐ Disagree
- ☐ Slightly disagree
- ☐ Neither agree nor disagree
- ☐ Slightly agree
- ☐ Agree
- ☐ Strongly agree

40) Community service is necessary to making our communities better.

- ☐ Strongly disagree
- ☐ Disagree
- ☐ Slightly disagree
- ☐ Neither agree nor disagree
- ☐ Slightly agree
- ☐ Agree
- ☐ Strongly agree

41) It is critical that citizens become involved in helping their communities.

- ☐ Strongly disagree
- ☐ Disagree
- ☐ Slightly disagree
- ☐ Neither agree nor disagree
- ☐ Slightly agree
- ☐ Agree
- ☐ Strongly agree

42) Community service is a crucial component of the solution to community problems.

- ☐ Strongly disagree
- ☐ Disagree
- ☐ Slightly disagree
- ☐ Neither agree nor disagree
- ☐ Slightly agree
- ☐ Agree
- ☐ Strongly agree

Almost done. Use the following scale to rate how much you AGREED or WOULD'VE AGREED with the following BEFORE your service-learning rotations.

43) The more people who help, the better things will get.

- ☐ Strongly disagree
- ☐ Disagree
- ☐ Slightly disagree
- ☐ Neither agree nor disagree
- ☐ Slightly agree
- ☐ Agree
- ☐ Strongly agree

44) There are people who have needs which are not being met.

- ☐ Strongly disagree
- ☐ Disagree
- ☐ Slightly disagree
- ☐ Neither agree nor disagree
- ☐ Slightly agree
- ☐ Agree
- ☐ Strongly agree

45) My contribution to the community will make a real difference.

- ☐ Strongly disagree
- ☐ Disagree
- ☐ Slightly disagree
- ☐ Neither agree nor disagree
- ☐ Slightly agree
- ☐ Agree
- ☐ Strongly agree

46) Would you seek out an opportunity to do community service in the next year?

- ☐ Strongly disagree
- ☐ Disagree
- ☐ Slightly disagree
- ☐ Neither agree nor disagree
- ☐ Slightly agree
- ☐ Agree
- ☐ Strongly agree

For the following questions, please respond based on your exposure to the pediatric population during your service-learning experience. For these questions, the pediatric population is defined as anyone between the ages of 0 and 13 years.

47) During your service-learning rotations, how many patients (approximately) did you treat that were 0-13 years old?

- ☐ None
- ☐ 1-5
- ☐ 6-10
- ☐ 11-15
- ☐ 16+

48) The children (0-13 years old) you treated during your service-learning rotations had:

- ☐ No caries
- ☐ Mild caries (1-2 teeth)
- ☐ Moderate caries (3-6 teeth)
- ☐ Severe caries (>6 teeth)

49) Of those children, how many were 0 to 3 years old?

- ☐ None
- ☐ 1-5
- ☐ 6-10
- ☐ 11-15
- ☐ 16+

50) During your service-learning rotations, I gained experience in performing the following treatments on pediatric patients. Check all that apply.

- ☐ Exam, prophylaxis and fluoride treatment
- ☐ Sealants
- ☐ Local anesthesia
- ☐ Simple restorative
- ☐ Stainless steel crowns
- ☐ Pulp therapy
- ☐ Extractions

51) Has your service-learning experience made you feel more confident treating the pediatric population? (Y/N)

- ☐ Yes
- ☐ No

52) What are your expectations for the level of experience you should gain in treating children (0-13 years) during your service-learning rotations? Check all that apply.

- ☐ Diagnosis and treatment planning
- ☐ Sealants
- ☐ Restorative care
- ☐ Behavior management
- ☐ I do not plan to treat children in my practice

Now we would like to ask some questions about you.

53) What is your gender?

☐ Female
☐ Male

54) How old are you in years?

_____

55) Ethnicity, check all that apply:

☐ White
☐ Black, African American
☐ Hispanic, Latino, or Spanish Origin
☐ American Indian or Alaska Native
☐ Asian or Pacific Islander

56) Prior to dental school, did you do community or volunteer work?

☐ Yes, regularly
☐ Yes, occasionally
☐ No

57) During dental school, did you participate in volunteer community service activity (not assigned) outside the dental school curriculum? This can be related to dentistry or not.

☐ Yes, regularly
☐ Yes, occasionally
☐ No

58) What is the biggest barrier to provide community service as a practicing dentist?

☐ Money: I have loans to pay for.
☐ Time: I would not have extra time for community service.
☐ Interest: I am not interested in community service.

59) Please add any other comments you have about your service-learning experiences.

Press the SUBMIT button below.
Thank you for your help in understanding service-learning and community service!

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