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Including a Service Learning Educational Research Project in a Biology Course-I: Assessing Community Awareness of Childhood Lead Poisoning

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A university course project was developed and implemented in a biology course, focusing on environmental problems, to assess community awareness of childhood lead poisoning. A set of 385 questionnaires was generated and distributed in an urban community in North Carolina, USA. The completed questionnaires were sorted first into yes and no sets based on the responses obtained for the first question, which gauged the participants' awareness of lead as an indoor pollutant at 71% (n=273). For the other questions, the yes response percentages ranged from 30%-67%, with the exception of the fifth question, which was on awareness of lead's particular impact on children that received the largest percentage of total responses (85%; 327/385). Using Chi square (χ^2) analysis, the study revealed that university education levels among the participants in the study significantly enhanced awareness of the body systems affected by lead poisoning ($\alpha<0.02$), whereas age significantly enhanced awareness of the treatment of lead poisoning ($\alpha <0.02$), its prevalence, causes, and the body systems affected ($\alpha<0.05$). A majority of the participants showed interest in learning about lead poisoning (67%), but perhaps not only through a university seminar (42%). The project showed that involvement of students in innovative communication avenues between universities and communities, aimed at enhancing public awareness of a major environmental health risk, is possible through a biology course project in which students are part of the project's development, implementation and analysis. Also, such an educational research project can, despite some limitations, offer educational opportunities that can intensify the students' interest in the course and knowledge of the research topic.

Keywords: childhood lead poisoning, community awareness, service learning

Since the phase-out of lead-based gasoline in the USA in the mid-1970s and the enactment of regulations limiting lead content in paint for residential use in 1978, lead levels in the environment have diminished dramatically, but children in the USA are still susceptible to the harmful effects of lead. This toxic metal still poses a health threat for residents of old homes, and there remains widespread lead contamination in urban population centers (Borland & Lyle, 2008; Centers for Disease Control and Prevention [CDCP], 1991; Juberg, Kleinman & Kwon, 1997; Meyer, Brown & Faik, 2008). The CDCP (2007) later showed that numbers of US children with blood lead levels (BLL) of > 10 ng/dL have been consistently diminishing, and these trends have been well forecasted by Jacob and Nevin (2006). But even at the currently safe BLL levels (> 10 µg/dL) there may still be risk to children, whose exposure can result in a variety of neurobehavioral-cognitive deficits (Braun, Kahn, Froehlich, Auinger & Lanphear, 2006; Lanphear et al., 2005; Lidsky & Schneider, 2006; Rosen, 1995).

Because lead poisoning in children encompasses living conditions (residential, economical, medical, as well as environmental), many agencies have been working at preventing this chronic problem and abating lead as an indoor pollutant. The efforts by the CDCP in that regard have long gone in parallel with those by the US Environmental Protection Agency (1990), the US Department of Housing and

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Urban Development (1990), the National Academy of Sciences (1993), and the American Academy of Pediatrics (1993). Although these efforts, among others in the US, have contributed to the dramatic reduction in the number of children with elevated BLL (EBLL), unfortunately, it is children from the socioeconomically and environmentally disadvantaged backgrounds who persistently and disproportionately continue to populate the EBLL tables generated annually (Jacobs & Nevin, 2006).

In their extensive research on lead poisoning among socioeconomically and environmentally disadvantaged children in North Carolina, USA, and its link to poor school performance Miranda et al (2007) and Miranda, Kim, Reiter, Overstreet Galeano & Maxson, (2009) concluded that lead exposure does contribute to the academic achievement gap. Furthermore, such findings in one US state can be extrapolated nationally because it is well documented that lead exposure averages are higher among minority and socioeconomically and environmentally disadvantaged children nationwide (Nevin, 2009). In a study on African refugee children with EBLL, who were settled in the US state of New Hampshire in 2004, Plotinsky et al. (2008) emphasized the importance of screening and follow-up for these children, especially since some of them were settled in old (pre-1959) homes, which may have added to their lead poisoning risk. In other US states a variety of approaches and tools were used such as the multifaceted lead poisoning awareness campaign by McLaughlin, Humphries, Nguyen, Maljanian & McCormack (2004) that included the application of geographic information system (GIS) models in examining several environmentally-relevant geographic features of urban neighborhoods. The GIS tool has proven effective also in the case of directing childhood lead poisoning prevention programs in North Carolina by Miranda, Dolinoy and Overstreet (2002).

Perhaps it has been evident to many parents that it may not be enough to believe that their children were safe from lead exposure as long as they lived in new housing. Aware parents have been making an effort to ensure that their children were not exposed to lead while at an unregulated day care facility, during extended visits to relatives living in old homes, or while playing in an urban playground. But, nowadays there are new and pervasive risks of lead poisoning from lead contaminated imported goods that are flooding the US market, some of which target children and young people, such as holiday products (Weidenhamer, 2009), low-cost fashion jewelry (Weidenhamer & Clement, 2007), ceramic products (Meyer, McGeehin & Falk, 2003), and toys (Meyer, Brown & Falk, 2008). With this realization, it is evident that the need is still there for environmental educators to stress awareness and blocking of new routes of exposure to lead, and to educate the public on intervention and treatment options in the event of acute lead poisoning (Jin et al., 2011; Meyer 2008; Meyer et al., 2005; Woolf, Goldman & Bellinger, 2007)

In the study presented here the university students used the knowledge they acquired on lead poisoning in their Biology course titled “Environmental Problems” and participated in a service learning educational class project through which a specifically-designed Yes/No questionnaire was developed, administered to community participants on and off-campus, and analyzed with the immediate goal of assessing the community awareness of this preventable but serious environmental problem. The long term goal was to enhance learning among the students while fostering productive dialogue and strong community-university partnerships to alleviate the risk of lead poisoning among children in the community.

Methods

In the questionnaire, shown in Appendix, the questions (Q1-Q10) proceeded from general awareness of lead as an indoor air pollutant (Q1); to the causes (Q2), prevalence (Q3), and assumed parental awareness (Q4) of lead poisoning. Emphasis on children as being at higher risk than adults to lead poisoning (Q5), symptoms (Q6), precaution and prevention (Q7) and treatment (Q8), followed. The final two questions were to gauge the participants’ interest in acquiring additional information on lead poisoning (Q9) and whether this acquisition can be in the form of a university seminar (Q10). The questionnaire and the project application package were guided successfully by the corresponding authors through the mandatory approval process of the university's institutional review board (IRB), which is the university committee formally designated to approve, monitor, and review biomedical and behavioral research involving humans.

The students, who received in-class training on all aspects related to the proper administration of the questionnaires in the community, administered the questionnaires in the urban community both on and off the university campus. They learned the best practices to ensure participant anonymity, as well as the best approaches to explain to the participants clearly and without any intrusiveness the purpose of the study and the reasons behind the questions. The questionnaires were numbered and stamped "original" on the back before they were handed out to the students for distribution. The students collected the questionnaires then tallied the responses to the questions using Microsoft Excel spreadsheets.

The experimental approach involved an initial phase of compiling the collected questionnaires (a total of 388), and then dividing them into two categories based on the responses given to Q1. After this step, the questionnaires went into two groups. Those that had a yes answer to Q1 went into the yes or "Y group" and each sample was given the Y prefix followed by its number (Y001 - Y273), and those that had a no answer to Q1 went into the no or "N group" in which each sample was given the N prefix followed its number (N001 - N112.). Two questionnaires that were found to be blank and one questionnaire that had responses to all questions except Q1 were not included in the study, and therefore the resulting total sample number was 385. The "Yes" answer to each question was given a value of 1, and the "No" answer was given a value of 0.

On each questionnaire, in addition to answering the 10 Yes/No questions, the participant was also asked to circle his/her age range (18-20 years, 20-30 years, 30 to 40 years or >40 years) and educational level (secondary, high school, or university). Not providing one or both of these demographic data did not preclude the questionnaire from the study as a whole but only from sections that analyzed the impact of age and/or education as described below.

In order to combine the information provided by the questionnaires in one comprehensive master sheet, an innovative merger of the Excel data sheets was devised in which the educational level was assigned a letter (g = secondary; p = high school, and b = university) and the age groups were assigned an Arabic numeral (1 for <20, 2 for 20-30, 3 for 30-40 and 4 for >40). As a result, b1Y202 for example would be the 202nd participant who answered "Yes" to Q1, had university-level education and was <20 years of age; and g4N011 for example would be the 11th participant, who answered "No" to Q1, had only secondary-level education and was >40 years of age. The prefix devised for the samples that lacked both age and educational level information was "na" followed by the sample number, and that for samples that had the age but not the educational level was "nae" followed by the numeral corresponding to the age group and then the sample number, e.g. nae2N055. There were no samples collected that had the educational level but lacked the age group, which would have had the prefix naa. Statistics on the data was conducted using Chi square analysis.

Results

The Y group (n=273) samples were tallied for "Yes" responses to all questions, and those that followed Q1 (273) in decreasing order were: Q5 (247); Q7 (209); Q2 (198); Q4 (193); Q9 (180); Q3 (155); Q8 (110); Q10 (103); Q6 (98), as shown in Table 1. It was evident that among the participants who were aware of lead as an indoor pollutant (Q1) there was also heightened awareness that children are at higher risk (Q5; 247). This heightened awareness was also observed in the N group (n=112) for which Q5 received 80 "Yes" responses (Table 1). In fact when "Yes" responses for all 385 samples were compiled, Q5 had the highest number overall (327/385 ~ 85%; Table 2). Only 15 % of the participants did not believe that children were at a higher risk of lead poisoning. In contrast, Q6 that addressed the specific clinical issue of what body systems are impacted by lead exposure was the least familiar question to all participants.

Table 1. Responses and percentages per question for the Y group and N group

	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10
In the Y group										
Yes	273	198	155	193	247	98	209	110	180	103
% (n=273)	100%	73%	57%	71%	90%	36%	77%	40%	66%	38%
No	0	75	118	80	26	175	63	162	92	170
Unanswered							1	1	1	
In the N group										
Yes	0	40	33	58	80	18	46	22	78	60
% (n=112)	0%	36%	29%	52%	71%	16%	41%	20%	70%	54%
No	112	72	78	54	32	94	66	90	34	51
Unanswered			1							1

Note: The Y group included all the samples that had "Yes" in response to question #1, and the N group included all the samples that had "No" in response to question #1

In looking more closely at responses to Q6 in Table 1, 84% of the N group did not know Q6 (94/112) vs. 64% in the Y group (175/273), and in Table 2, Q6 had the lowest number of yes responses among all questions in the whole set of 385 questionnaires (116/385 or 30%). In gauging the participants' interest to learn more about lead poisoning (Q9) and whether part of this learning could be through a university seminar (Q10), the percentages of yes responses were 66% (180/273) and 38% (103/273), respectively, in the Y group vs. 70% (78/112) and 53% (60/112), respectively, in the N group (Table 1). For the Y and N groups combined (Table 2) the percentages of yes responses were 67% (258/385) for Q9, but only 42% (163/385) for Q10.

Table 3 lists the samples for which participants answered all the 10 Yes/No questions but chose not to provide the education level (nae; 19 samples) or both of age and education (na; 22 samples). The quantitative impact of these omissions is shown in Table 4 that provides in a grid format all of the aforementioned categories.

Table 2. Cumulative Yes responses and percentages per question for all 385 samples

Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10
273	238	188	251	327	116	255	132	258	163
71%	62%	49%	65%	85%	30%	66%	34%	67%	42%

Table 3. Samples that lacked one or both of the demographic information on age and education

nae1N077	naY021
	naY022
nae2Y017	naY031
nae2Y035	naY050
nae2Y062	naY057
nae2Y082	naY117
nae2Y236	naY144
nae2Y253	naY201
nae2N038	naY262
nae2N055	
nae3Y016	naN002
nae3Y034	naN003
nae3Y041	naN004
nae3Y043	naN014
nae3Y075	naN019
nae3Y106	naN028
nae3Y189	naN040
nae3 Y224	naN074
nae3Y240	naN098
nae3N064	na N111
nae4Y097	
nae4Y187	
nae4Y188	

Note: The nae prefix was used for the samples that lacked the education information but included age (a total of 22 samples), whereas the na prefix was used for the samples that lacked both age and education information (a total of 19 samples).

The responses and percentages for all four age groups of the participants in the study are shown in Table 5, showing the 20-30 years as the largest age group range in the study. Those for the three education levels are shown in Table 6, showing the university-level as the largest education group in the study.

Using χ^2 statistical analysis, the impact of age on the yes responses given to the 10 questions was determined to be significant for questions Q2, Q3, Q6, and Q8 as shown in (Table 7). The most significant data points are shown atop the corresponding questions in the bar-graph in Figure 1.

In analyzing the impact of the education level on the yes responses given, it was determined that because the number of participants in the secondary education category was extremely low, it was to be combined with the high school group under the new description of “pre-university”. Using χ^2 statistical analysis the impact of university education was determined to be significant, albeit for only two questions Q8 and Q10 (Table 8). The most significant data points of the education levels (pre-university and university) are shown atop the corresponding questions in the bar-graph in Figure 2.

Table 4. Impact of the demographic aspects of age and education of the cumulative questionnaire data

	<20 years	20-30 years	30-40 years	>40 years	Subtotals for education
b (university)					
Y group	26	111	27	28	192
N group	14	35	10	4	63
G (secondary)					
Y group	1	0	1	1	3
N group	1	0	0	2	3
P (high school)					
Y group	16	14	8	13	51
N group	13	0	6	5	32
nae@					
Y group	0	6	9	3	18
N group	1	2	1	0	4
Subtotals for age	72	176	62	56	366
na$					
Y group			9		
N group			10		
Total number of samples = 385					

Note: @ nae stands for educational level not available and $ na stands for both educational level and age not available.

Discussion

The service learning educational research project presented here aimed to shed light on the level of awareness in an urban community in North Carolina, USA, of lead as an indoor pollutant and how the seriousness of its impact on children's health was viewed by questionnaire participants (Figure 1). The questions progressed from the general awareness level to the more clinically- and environmentally-specific levels. The sequence of the three questions (Q6 through Q8) that addressed specifics such as the body systems impacted most by lead as well as lead poisoning prevention and treatment, were not only important in their own right and needed to be included in this study, but also their positioning within the questionnaire was deliberate, as they were followed immediately by the education-related (Q9) and service-related (Q10) questions. These last two questions aimed to gauge the community's readiness to look toward a solution to this environmental problem via a university-community partnership.

Table 5. Distribution with percentages of the 4 different age ranges of the participants between the Y group and the N group

	<20	20-30	30-40	>40	Total
Y group	43 12%	131 36%	45 12%	45 12%	264 72%
N group	29 8%	45 12%	17 5%	11 3%	102 28%
Total	72 20%	176 48%	62 17%	56 15%	366[@] 100%

Note: @ the total number of samples that included the age range (366) was the 385 collected samples less the 19 na samples.

Table 6. Distribution with percentages of the 3 different education levels of the participants between the Y group and the N Group

	Secondary	High School	University	Total
Y group	3 <1%	51 15%	192 56%	246 71%
N group	3 <1%	32 9%	63 19%	98 29%
Total	6 <2%	83 24%	255 74%	344[@] 100%

Note: @ the total number of samples that included the both the age range and educational level (344) was the 385 collected samples less the 19 na samples and the 22 nae samples.

After responding to eight questions on one's knowledge of lead poisoning, which could have revealed to the participant the magnitude and complexity of the problem of lead poisoning, the participant reached Q9 to which a large number of participants answered "Yes" (Table 2). It could be argued that the 34 participants from the N group, who were not aware of lead as an indoor pollutant (Q1) and did not wish to learn more about it (Q9), could have been uninterested in the issue as a whole. But, the main focus of this survey was to look at the community needs that were evident since 258 out of the 385 participants (67%) wished to learn more about lead poisoning. This high ratio provided a cornerstone for university – community partnership on this particular issue.

Based on the responses to Q10, it was evident that the planning of any educational effort to enhance the community awareness of lead poisoning would need to involve more than just a university seminar on the topic. The yes responses observed in Q9 dropped for Q10 and it would be understandable that many members of the community would have considered a seminar at the university too academic and therefore may not be the desired format to provide the information needed. Based on this observation, future studies will involve the students in course projects that organize visits by experts to community venues, such as churches or town halls, where a more interactive informal format can be implemented.

Table 7. The Yes responses with percentages to the 10 questions based on age range

	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10
<20 (n=72)	43 60%	33 46%	30 42%	39 54%	59 82%	15 21%	39 54%	19 26%	44 61%	32 44%
20-30 (n=176)	131 74%	112 64%	83 47%	116 66%	147 84%	57 32%	117 66%	60 34%	121 69%	78 44%
30 -40 (n=62)	45 73%	40 65%	27 43%	45 73%	56 90%	15 24%	44 71%	19 31%	42 68%	27 44%
>40 (n=56)	45 80%	44 79%	38 68%	40 71%	49 88%	23 41%	42 75%	29 52%	37 66%	21 38%
χ^2 (df=3)	7.54	8.94*	8.92*	3.30	0.46	8.17*	3.74	10.76**	0.57	0.63

Note: Chi Square analysis (χ^2) at degrees of freedom of 3 showing the significance at α<0.02(**) and at α <0.05(*)

Table 8. *The Yes responses with percentages to the 10 questions based on education level*

	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10
Pre-University (n=89)	54 61%	44 49%	31 35%	48 54%	65 73%	15 17%	44 49%	23 26%	47 53%	25 28%
University (n=255)	192 75%	163 64%	126 50%	170 67%	217 85%	89 35%	178 69%	95 37%	171 67%	119 46%
χ^2 (df=1)	1.44	1.99	2.64	1.39	0.91	6.23**	3.39	1.92	1.63	4.38*

Note: Chi Square analysis (χ^2) at degrees of freedom of 1 showing the significance at α<0.02(**) and at α <0.05 (*)

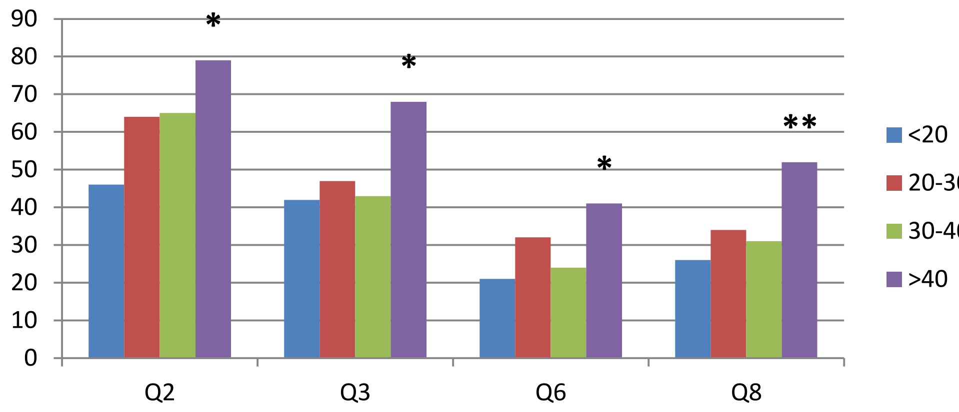

Figure 1. The bar-graph shows comparison of the percentages of Yes responses (Y-axis) among the 4 age groups to questions Q2, Q3, Q6, and Q8 (X-axis). χ^2 analysis revealed significant differences among the graphs that were depicted by (*) for α <0.05, and (**) for α <0.02. The percentages that were significantly different were included in the graph.

Also, multi-faceted approaches such as those described by McLaughlin et al. (2004) will serve as models for a wider scope approach. Although only 15 % of all participants did not believe that children were at a higher risk than adults of lead poisoning (Q5; Table 2), that percentage was still deemed too large in the opinion of the authors as well as the students. This group would be in most need of receiving education on lead poisoning regardless of their education level, because considering the study's age distribution, those participants may have been young parents to little children or soon to be.

The authors were pleased that although the present study, as many others, was not without its limitations, these limitations when addressed and reflected upon in class presented a number of valuable educational opportunities and enhanced service learning experiences to the students. In addition, they provided a useful platform for future studies on community awareness of lead poisoning as well as other environmental problems. Three limitations are presented and discussed in the following paragraphs with emphasis placed on lessons learned as well as direct and indirect class and community benefit.

The first limitation was observed during the data compilation phase when it became evident that the largest number of participants by far came from the university-level group. This finding could have been attributed to the fact(s) that (a) some students chose to administer their questionnaires on campus, which was acceptable but not encouraged, and/or (b) the targeted urban community enjoyed a highly-educated population and the likelihood was high to interview university-level participants at shopping centers or churches. Even after acknowledging the latter point on the putative higher level of education in the urban setting of the study, the choice made by some students to distribute a relatively large number of questionnaires on campus was discussed and reflected on in class. A number of students reflected that although they did indeed distribute their samples on campus several of their on-campus participants were non-academic or non-administrative individuals, such as janitorial staff, cafeteria employees, and sales personnel in the student union store, to name a few. The major educational opportunity that presented itself during and after such reflections that was of most benefit to the students was a heightened understanding and appreciation of the fundamental requirement of eliminating bias in data collection as in all other aspects of research.

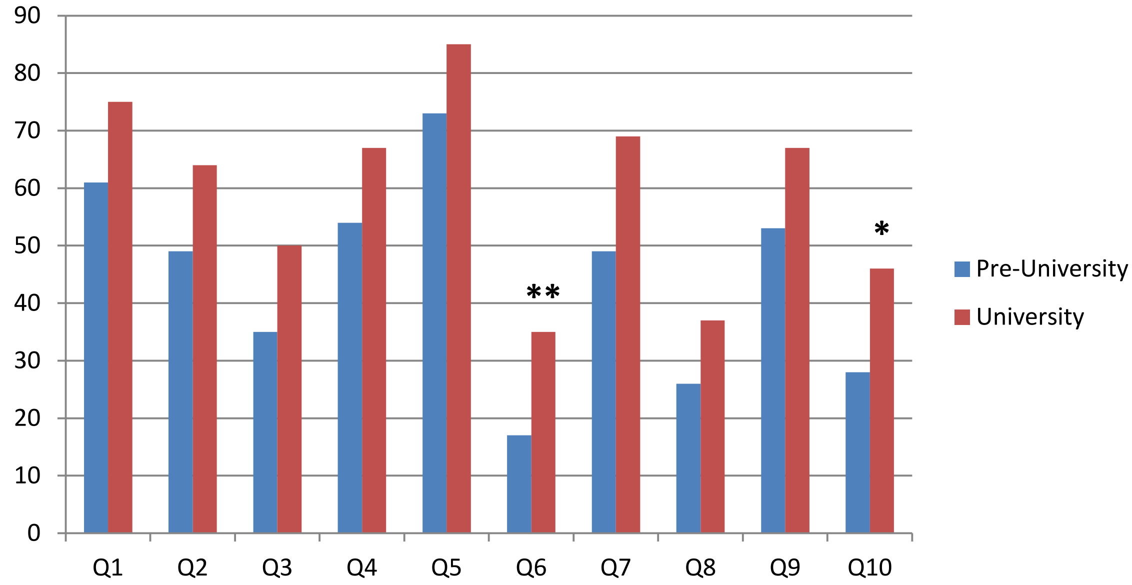

Figure 2. The bar-graph shows the comparison of the percentages (Y-axis) pre-university (combined secondary and high school) and university participants for the Yes responses to the 10 questions (X-axis). χ^2 analysis revealed that only two questions showed significant differences that were depicted by (*) for α<0.05 [Q6], and by (**) for α <0.02 [Q10].

An issue that could be perceived as a second limitation of the study relates to the fact that while the questionnaire succeeded in obtaining the age and education levels of most of the participants, it did not address directly their socioeconomic status. The authors are fully aware that several studies on lead poisoning had as their main focus socioeconomically-disadvantaged groups and communities (Jacobs & Nevin, 2006; Miranda et al., 2007; Plotinsky et al., 2008). But, it is important to stress that the scope of the study presented here was addressing awareness in an urban community as a whole with its cross-section of socioeconomic groups. Therefore, since the socioeconomic angle was not at the core of this study, direct questions on income levels and occupations were not included. It is of interest to note, however, that the educational level demographic, which was at the core of this study alongside age, may have provided an indirect indication, albeit unintentional, of the socioeconomic status of the participants. The educational opportunity that presented itself in this instance was to instruct the students on the good practices of creating a questionnaire to serve as an effective survey tool by obtaining the participants' responses to the main research questions. Nonessential inclusions that may render a questionnaire "needlessly" more intrusive or more laborious to complete, without enhancing its effectiveness as a survey tool, need to be avoided. Students observed that even with the comparatively much less intrusive age and education level demographics some participants still chose not to circle their respective categories, as shown in Table 3. In fact it became evident to the students that with surveys there is always the intrinsic risk that some participants would deliberately refrain from providing full answers or withhold the correct answers, be they demographic or otherwise.

In this study as in other studies completed to date by this biology class the questionnaires that have been distributed were prepared exclusively in the English language. With hindsight and the benefit of enhanced awareness of the present ethnic distribution in urban communities in North Carolina, the authors believe that in future service learning educational projects an additional set of questionnaires needs to be prepared in the Spanish language. Such an effort should ensure a more representative participants' pool. Questionnaires prepared in Spanish will enable members of the community, who are yet to be fully proficient in English, to comprehend the questions and become able to participate in a future study such as the one presented here. The dynamic educational opportunity that can arise from addressing this third limitation can be the potential inter-departmental partnering between majors in Biology and majors in Spanish in generating these questionnaires and participating in community-university partnerships.

The main advantages to the students of including such a project in a biology course can be categorized as academic/course-centered and experiential/service learning-centered. The observed academic advantage of the project was the students' acquisition of relevant scientific information through a variety of pedagogical avenues that seemed to enhance the traditional didactic lectures provided by the professor. A close second advantage was channeling the computer skills that most students possess nowadays into an advanced academic research project. The computer technology-intensive approach in this course encompassed not only instruction but also student assessment through exam questions, as well as evaluation of students' data compilations, analysis, and reporting. On the experiential service learning front, university students were exposed first-hand to the "town-gown divide". And when the students found themselves an integral part of a university-community dialogue aiming at bridging that divide, their team work and reflections in class underscored their readiness to embrace the project and the course as well as their deeper appreciation of the value of their education.

In conclusion, enhancing awareness of lead poisoning can be extremely effective when work is conducted at the local level among educators, clinicians, and community groups. Meyer et al. (2005) underscored the local efforts toward prevention of childhood lead poisoning and the strong partnerships that can be forged to combat this serious environmental health problem. The study presented here showed that there existed a community need, and that the university can become a stakeholder among other community leaders, namely health authorities, health centers, schools and daycares, in responding to the community need.

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Appendix. The 10 questions used to assess the community awareness of lead poisoning in children, addressing causes, prevalence, risks, symptoms, prevention, treatment, and interest in obtaining more information generally and from the university specifically. Also, included are the age and education ranges to which the participants belonged.

Lead Poisoning Questionnaire

Please circle your answer:

Age Group: 18- 20 20-30 30-40 Older than 40

Education level: Secondary High School University

1.	Are you aware of lead as an indoor pollutant?	Yes	No
2.	Do you know the causes of lead poisoning?	Yes	No
3.	Do you believe lead poisoning is very common?	Yes	No
4.	Do you believe that having children below the age of 10 increases a person's awareness of lead poisoning?	Yes	No
5.	Do you believe that children are at a higher risk of lead poisoning?	Yes	No
6.	Do you know what body systems suffer most from lead poisoning?	Yes	No
7.	Are you aware that precautions can be taken to lessen the risk for lead poisoning in children?	Yes	No
8.	Are you aware of treatments that can cure or reduce the effects of lead poisoning in children?	Yes	No
9.	Would you be interested in learning more about lead poisoning in children?	Yes	No
10.	Would you be interested in attending a seminar at NCCU (the university) on lead poisoning in children?	Yes	No