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Dear Readers,

In this number the International Electronic Journal of Elementary Education (IEJEE) addresses a wide range of educational topics. After publishing our special issue on metacognition, we received overwhelming positive and encouraging responses from our readers. Thanks once more to the editors of that special issue: Dr. Annemie Desoete and Dr. Gokhan Ozsoy.

The world of researchers is provided more opportunities to communicate with their colleagues, practicing educationists, and decision makers now than it was the case for a decade ago. Thanks to ICT. I am, as an Editor in chief of IEJEE, considering peer-reviewed scientific publishing through electronic channels as a contemporary way of dissemination of research based knowledge.

For each number of IEJEE, an increasing number of papers are being submitted. Without our editorial board members and international network of reviewers, it would not be possible to pursue our job: ensuring a fair, objective and respectful peer-reviewing of papers within a reasonable time period. In this number of IEJEE we are presenting six exiting papers.

Paul CALDARELLA and his colleagues are addressing mentoring, and stressing its importance among others by this sentence *"Mentoring is a way to address problems that can result from decreasing adult availability, support, and guidance in the lives of many children."*

Mustafa KIŞOĞLU and his colleagues are addressing prospective elementary science teachers' knowledge level about the greenhouse effect and their views on environmental education as a part of their teacher education. They argue that *"The fundamental factor of environmental education is teachers who are well-informed about environmental issues."*

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Debra HARWOOD and her colleagues are investigating the 'Young Children's Perceptions of Teasing within Peer Relationships'. They are reminding us the fact that teasing is a widespread among young children but an rarely addressed problem within educational research circles. We consider their paper as one of the important contributions to our knowledge base about this complex phenomenon. With their words *"Teasing is a complex relational and social-emotional issue involving many elements such as social cognition, understanding of intention, pretense, non-literal communication, and emotional regulation."*

Lautie KATZ and her colleagues are focusing on 'Professional Development for the Early Learning Content Social Studies Standards'. As many of us are aware of, the term 'standards' has become an widely used word in many countries. It has its proponents and opponents like many other policy-originated concepts in the field of education. It seems to us that the authors are making a sound point in their well-written paper: *"The findings suggest that early childhood educators can benefit from sustained professional development that not only addresses content standards but also helps them to understand how to incorporate the standards into their existing curriculum using developmentally and culturally appropriate pedagogy."*

Ottilia CHAREKA discusses the role of prior knowledge in the Canadian young children's conceptions about the future in the global community. She draws on a data from a comparative study. Her findings indicate that *"Canadian children were optimistic about the future for themselves and their community but less so for the globe. More so than other children, Canadian children were concerned with issues of social justice, issues such as discrimination and racism, and with improving the environment, which might be attributed to the emphasis that is placed on these issues in their school curriculum"*. She then argues that assessing prior knowledge should be a priority for those considering development and implementation of global education curricula.

Mehmet AYDENİZ addresses the importance and the need of enhancing pre-service elementary school teachers' understanding of essential science concepts through a reflective conceptual change model. The paper is based on a literature review about conceptual change model, and an empirical study. In addition to his several well formulated arguments and well documented empirical findings, he emphasizes an important factor in teacher education with regard to prospective teacher candidates' misconceptions *"Making pre-service elementary teachers' misconceptions visible and changing them through effective instruction has significant implications for how they may teach these science concepts once they become classroom teachers."*

I hope that the readers of this number of IEJEE also will find the papers exiting and inspiring. I want to express my deep gratitudes to every contributers. I also want to express my admirations and thanks to my closest colleague and executive editor Dr. Turan Temur for his much appreciated efforts for materializing this number of IEJEE.

Prof. Dr. Kamil Özerk, Editor in Chief
University of Oslo
Department of Education
NORWAY

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School-based mentoring: A study of volunteer motivations and benefits

Paul CALDARELLA*
Brigham Young University, United States

Robert Jeff GOMM
Brigham Young University, United States

Ryan H. SHATZER
Brigham Young University, United States

D. Gary WALL
Brigham Young University, United States

Abstract

While research has been conducted concerning the effects of school-based mentoring on at-risk students, limited work has focused on the volunteer mentors. This study examined the motivations of adult volunteers and the benefits of their participation in a six-month, school-based mentoring program. A total of 31 volunteers completed adapted versions of the Volunteer Functions Inventory and a post-survey as part of a program in which they mentored at-risk elementary school students. Volunteers were more satisfied with their mentoring experience when their perceived benefits matched their initial motivations, though this did not seem to impact their intentions to mentor again in the future. Volunteers' motivations tended toward expressing important values or gaining greater understanding, though some younger volunteers were also motivated to gain career-related experience. Implications for school-based mentoring programs are addressed.

Keywords: Volunteers, mentors, elementary schools, school-based mentoring

Introduction

Children need positive relationships with adults for healthy development. The National Association for the Education of Young Children (2008) has noted that constructive relationships, in which a child feels valued, are essential for the development of the child's sense of security, self-esteem, academic performance, and ability to interact with others. Unfortunately

* E-mail for correspondence: paul_caldarella@byu.edu

more children may be receiving inadequate adult support now than in the past due to changes in families and societal norms (Jekielek, Moore, & Hair, 2002; Rhodes, Reddy, Roffman, & Grossman, 2005).

Mentoring is a way to address problems that can result from decreasing adult availability, support, and guidance in the lives of many children. A mentor can provide a caring and supportive relationship, contributing to a corrective experience for children who may have unsatisfactory relationships with other adults in their lives (Rhodes, 2005). Mentoring programs are meant to facilitate such appropriate, meaningful relationships between children and adults leading to positive child outcomes such as improved social skills and self-esteem (Dappen & Isernhagen, 2005; DuBois, Neville, Parra, & Pugh-Lilly, 2002).

Evaluation of and research on mentoring programs has occurred since the 1970's, but more work is needed (DuBois, Holloway, Valentine, & Cooper, 2002), particularly where the volunteer mentors are concerned. While some empirical evidence suggests a positive impact of mentoring on mentors (Karcher, 2009; Evans, 2005) there appears to be a need for more investigation of the motivations and perceived benefits for volunteers who participate in school-based mentoring.

Benefits of School-based Mentoring

Researchers have suggested that school-based mentoring is associated with improvements in students' self-esteem, attitudes towards school, and peer and parental relationships (Hancock, 2003; Rhodes et al., 2005). Some research studies have found school-based mentoring to be associated with students' academic and behavioral improvements (see e.g., Caldarella, Adams, Valentine, & Young, 2009; Keating, Tomishima, Foster, & Alessandri, 2002; Rhodes et al., 2005). Herrera (1999) found that mentors encouraged more positive relationships between the students, their teachers, and school administration. School-based mentoring also appears to be an effective intervention for students who have emotional and behavioral difficulties (see e.g., Caldarella et al., 2009; Glomb, Buckley, Minskoff, & Rogers, 2006; Herrera, Sipe, McClanahan, Arbreton, & Pepper, 2000).

Limited work has addressed the effects of school-based mentoring on the volunteer mentors, however preliminary findings have been positive. For example, high school students who served as mentors to at-risk peers reported larger gains in school-related connectedness and self-esteem than did a comparison group (Karcher, 2009). Positive effects of mentoring were also found for college students who mentored at-risk children in an elementary school, specifically increases in mentors' knowledge and understanding of child development and appropriate educational practices (Trepanier-Street, 2007). College-age mentors reported they were also learners as they mentored inner-city youth as part of a community-based mentoring program (Kafai, Desai, Peppler, Chiu, & Moya, 2008). Fresko and Wertheim (2006) demonstrated that volunteers may benefit from

participation in mentoring by increasing their sensitivity to at-risk children, improving their coping abilities, and learning how to deal and interact with children. Others have reported that mentoring allows volunteers to expand their social networks, improve their teaching and training skills, and increase their personal satisfaction (Ellis & Granville, 1999). In the context of mentoring new teachers, Gilles and Wilson (2004) reported that mentoring provided several benefits to the mentors including professional development opportunities, increased confidence, and a larger network of cohorts. However, additional research is needed to more fully understand the motivations and benefits reported by volunteers who serve as school-based mentors to at-risk students. Such research could help improve volunteer recruitment and retention, as these are frequently the areas of greatest difficulty in the establishment and maintenance of mentoring programs (Jucovy, 2001).

Motivations of Volunteers

While there is a lack of research on the motivations of school-based mentors, research has investigated volunteering in general. Clary et al. (1998) empirically derived six functions served by volunteering and labeled these as values, understanding, social, career, protective, and enhancement. These functions can be both motivations to volunteer and benefits received from volunteering. Individuals volunteer in order to express important *values*, such as humanitarian concern and altruism. *Understanding* addresses the need for individuals to seek learning experiences that will help them better understand themselves and others. The *social* function suggests that volunteering allows an individual to be with one's friends and engage in activities viewed favorably by important others. Individuals motivated by the *career* function volunteer in order to gain career-related experience. Volunteering can be *protective*, as it enables the individual to reduce negative feelings such as anxiety, loneliness, and guilt. Finally, *enhancement* helps the individual to feel useful, to increase self-esteem, or to maintain positive emotions.

Clary and Snyder (1999) found values and understanding to be the strongest motivations of volunteers, and the desire to enhance career to be more important to younger than to older individuals. Clary et al. (1998) also found that volunteers have a tendency to be more satisfied with their experience and have greater intentions of volunteering again in the future when their initial motivations are fulfilled. This matching of motivations to benefits—the matching hypothesis— needs further investigation in the context of school-based mentoring.

Purpose of the Current Study

The purpose of this study was to evaluate volunteers' motivations and their perceived benefits from participation in a school-based mentoring program. The researchers hypothesized that values and understanding would be rated by the volunteers as their most important motivations, and that the

career motivation would be rated as more important by younger volunteers than by older ones, as found by Clary and Snyder (1999). This study also sought to test the matching hypothesis: that those volunteers who experienced a match between their motivations and perceived benefits would also report higher levels of overall satisfaction with mentoring and stronger intentions to continue to serve as mentors in the future. The findings of this study could provide suggestions to researchers, program directors, and policy-makers to more effectively recruit and retain new mentors and to decrease mentor attrition, thereby promoting potentially longer, more beneficial mentoring relationships.

Method

Setting and Participants

The setting for this study was a school-based mentoring program implemented as a project of a university-public school partnership. The partnership is a joint venture between a university and local school districts in the Intermountain West of the United States for the purpose of improving public education. Implementation took place in five elementary schools located in a suburban school district, which was part of this partnership. The schools are located in an area experiencing rapid growth, with a significant projected increase in student enrollment for the coming decade.

The primary participants were adult volunteers who were part of the school-based mentoring program. Volunteer mentors were sought from a variety of local organizations including the school district, the partnering university, the parent teacher association, nearby retirement communities and senior volunteer groups. Prospective volunteers were asked to complete an application requesting basic contact and demographic information, along with a brief interest questionnaire to help in matching them with students. Applicants were interviewed, and a background check was conducted for each. Of the 34 volunteers who served as mentors for this project, 31 (91%) participated in this study. See Table 1 for participant demographics.

Volunteers were assigned to third through sixth grade students who had been identified as at risk using the Systematic Screening for Behavior Disorders (Walker & Severson, 1992; see Caldarella et al., 2009 for more details). A total of 35 students were mentored by these 31 volunteers, with four volunteers each assisting two students. Students who participated in the mentoring program ranged from 8 to 12 years of age; 54% were male and 46% female. Student ethnicity was comprised of White (85%), Hispanic (12%) and Pacific Islander (3%). A total of 63% of the students received free or reduced price lunch, and 28% were enrolled in special education.

Table 1. *Demographic Information for the Adult Volunteer Mentors*

Item	*Category*	*Number*	*(%)*
Gender	Male	10	32
	Female	21	68
Age	21-30	2	6
	31-40	5	16
	41-50	6	19
	51-60	7	23
	Over 60	8	26
Education	High school	4	14
	Some college	10	36
	Associates	4	14
	Bachelor's	3	11
	Master's	5	18
	Doctorate	2	7
Employment	Business	4	13
	Clergy	1	3
	Education (K-12)	7	23
	Education (postsecondary)	2	6
	Law enforcement	2	6
	Non-employed	3	10
	Retired	8	26
	Student	4	13

Note. n = 31. Age and education were not reported for 3 participants.

Measures

In order to determine the motivations of the volunteers, mentors completed the Volunteer Functions Inventory (VFI; Clary et al., 1998), slightly adapted to fit the context of school-based mentoring (e.g., word *volunteer* changed to *mentor*). The 30-item VFI self-report instrument (see Appendix A) measures the six motivational functions identified by Clary et al., determining the extent to which these motivations are important to each volunteer. The VFI has been shown to be a valid and reliable measure, with factor analysis results from multiple samples suggesting a six-factor solution and Cronbach's alpha ranging from .80 to .89 (Clary et al., 1998). Both the VFI and the post-survey instrument described below use a 7-point Likert scale.

The 14-item post-survey (Clary et al., 1998) measures volunteers' perceived benefits, satisfaction, and intentions (see Appendix B). The first six items assess how closely volunteers' experiences fulfill their original motivations for volunteering, corresponding to the six functions on the VFI. The post-survey also contains three items which measure volunteers' overall level of satisfaction with their volunteer experiences, as well as three items measuring their intentions to continue to volunteer. Because the original post-survey was used to determine the benefits of general volunteering (Clary et al., 1998), the survey was also adapted to fit the context of school-based mentoring. Two items measuring short-term intentions did not easily

transfer to the context of the school-based mentoring program (e.g., "I will serve as a mentor somewhere else in the fall"). These two items were eliminated from further analysis, and only the three items measuring long-term intentions to mentor were used in this study.

Design and Procedures

This study used a survey methodology. All participating volunteers completed the VFI pre-survey at or near the beginning of the mentoring program in November and the post-survey near the end of the school year in May.

Matching of volunteer mentors with students was based on similarity of interests and a goal of assigning students with greater need to mentors with greater experience and ability. Volunteers were initially trained and told that they would be expected to mentor the same student for the school year and longer if possible. Each mentoring visit took place on or near the premises of the student's school. Volunteers and their students participated in a variety of activities during their visits, which included working toward academic and social goals, practicing skills, reading, socializing, and engaging in service projects, sports or other games. Meetings lasted 45-50 minutes, though frequency and time varied based on such factors as class or school activities, and student or mentor absences. There were 442 total mentoring visits, with an average of 12.6 visits for each student, ranging from 6 to 24 visits over six months.

Data Analysis

One-way ANOVA was used to examine which of the six motivations were most important to the volunteers, as well as which of the six benefits were rated the highest. Participating volunteers were grouped into four categories for each of the six functions based on their motivation and benefit scores, as was done by Clary et al. (1998). They were divided at the median based on their VFI scores (high motivations versus low motivations) and post-survey scores (high benefits versus low benefits), grouped as follows: high motivations-high benefits, high motivations-low benefits, low motivations-high benefits, and low motivations-low benefits. Contrast analyses were used to determine whether those volunteers who experienced a match between their motivations and benefits (i.e., high motivations-high benefits group) would be more satisfied with their mentoring experience and have greater intentions of volunteering in the future than the other three groups.

Results

One-way ANOVA results revealed a statistically significant difference among VFI functions regarding volunteers' *motivations* to mentor (see Table 2). Specifically, post-hoc tests showed that volunteer mentors indicated the values function as their most important motivation to mentor, while understanding was the next most important motivation. It was

hypothesized that younger volunteers would be more motivated by the career function than would older volunteers. This hypothesis was confirmed, as volunteers who were 40 years old or younger (M = 3.71, SD = 1.02) had a significantly higher career motivation than volunteers over the age of 40 (M = 1.99, SD = 1.42) [$t(26) = 3.51$, $p < .01$, $d = 1.41$].

Table 2. *Two Separate ANOVA Results Comparing the Six VFI Motivations and the Six Post-survey Benefits Scores*

	VFI		Post-survey	
VFI Functions	*M*	*SD*	*M*	*SD*
Values	6.39	0.55	6.10	1.08
Understanding	4.61	1.51	4.71	1.40
Social	3.53	1.28	6.29	0.82
Career	2.47	1.44	4.84	1.86
Protective	2.87	1.33	6.06	1.24
Enhancement	3.85	1.69	6.29	0.86
F	36.06*		10.57*	

Note. $n = 31$. $^{*}p < .001$.

One-way ANOVA results from the post-survey also revealed a statistically significant difference among VFI functions regarding the perceived *benefits* volunteers recognized after mentoring (see Table 2). Post-hoc tests showed that volunteers received more benefits related to the functions of values, enhancement, social, and protective than to understanding and career. All post-hoc tests were significant at the $p < .05$ level.

Overall, the volunteers in this study were satisfied with their mentoring experience (M = 6.47, SD = 0.74) and expressed intentions of mentoring again in the future (M = 5.63, SD = 1.20). Table 3 displays the means, standard deviations, and contrast results for each of the VFI functions. It was hypothesized that satisfaction and future intentions to mentor would be greater for those volunteers who reported a match between their initial motivations to mentor and the benefits they reported from their mentoring experience. Two sets of planned comparisons for each VFI function were computed to determine if volunteers with high motivation and high benefit scores would report higher satisfaction with the mentoring activities and greater intentions to volunteer in the future than the other three groups.

Table 3. *Contrast Results Comparing the High Motivation-High Benefits Group with the Other Three Groups for Satisfaction with Mentoring Activities and Future Intentions to Volunteer*

VFI Functions and Outcomes	High Motivations				Low Motivations				
	High Benefits		Low Benefits		High Benefits		Low Benefits		Contrast
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*t* (27)
Values									
Satisfaction	6.82	0.26	6.33	0.67	5.67	1.27	5.92	0.63	4.09**
Intention	6.04	1.05	6.00	1.73	5.00	0.75	4.25	0.83	2.55*
Understanding									
Satisfaction	6.67	0.45	6.37	0.93	6.80	0.30	6.00	0.99	1.24
Intention	5.58	1.19	5.96	1.32	5.93	1.23	5.00	1.03	0.01
Social									
Satisfaction	6.79	0.27	6.00	0.47	6.47	0.74	5.11	1.17	4.24**
Intention	5.94	1.14	5.50	2.12	5.40	1.24	4.89	1.02	1.48
Career									
Satisfaction	6.58	0.39	5.50	2.12	6.86	0.38	6.14	0.94	1.76
Intention	5.49	1.31	5.17	1.18	6.10	0.94	5.62	1.33	-0.17
Protective									
Satisfaction	6.76	0.29	6.22	0.19	6.74	0.46	5.00	0.98	4.69**
Intention	5.67	1.08	4.89	2.01	6.07	1.28	5.08	0.63	0.82
Enhancement									
Satisfaction	6.67	0.36	6.33	0.00	6.58	0.73	4.50	0.71	3.91**
Intention	5.62	1.05	5.00	2.83	5.81	1.27	5.33	0.94	0.55

Note. $n = 31$. $^{*}p < .05$. $^{**}p < .001$.

The first set of planned comparisons for each VFI function examined the satisfaction of volunteers with their mentoring activities. Participants who had a high motivation score and a subsequently high benefit score for the values, enhancement, social, and protective functions were more satisfied with their volunteer experience than were the other three volunteer groups. The other two functions, understanding and career, were in the hypothesized direction, but did not reach statistical significance. Thus if volunteers felt that their initial motivations were met through the

mentoring service, they tended to be more satisfied with their mentoring experience.

The second set of planned comparisons examined volunteers' intentions to mentor again in the future. In the contrast analyses, the values function was the only one that was statistically significant. This result suggests that future intentions to volunteer did not seem to be highly influenced by whether or not the volunteers' initial motivations were met through their mentoring experience. However, participants who were motivated to mentor in order to express important values, and felt that they had been able to do so, were more likely to mentor again in the future.

Discussion

The purpose of this study was to evaluate volunteers' motivations and their perceived benefits from participation in a school-based mentoring program. Volunteers in this study tended to be motivated to mentor in order to express important values or gain greater understanding. This finding is consistent with previous research, which also found that values and understanding tend to be the motivations that are rated highest by volunteers (Clary & Snyder, 1999). It is interesting to note that although volunteers in this study rated understanding as a high motivation, they reported understanding as the lowest benefit they received from mentoring. The function of understanding relates to the tendency for individuals to seek learning experiences that help them better understand themselves and others. The need to increase the potential for understanding could be addressed by ensuring that volunteer mentors are offered learning opportunities that can increase their understanding and knowledge, possibly through a training program or in development sessions with other mentors.

The motivation to mentor in order to gain career-related experience appears in this study to be more relevant to younger volunteers, as has been demonstrated in previous research with other volunteers (Clary & Snyder, 1999). This finding could be attributed to the reality that many of the younger volunteers are still progressing in their careers, while the older volunteers tend to be at the end of their professions and have little need for career-related experience.

This study also sought to test the matching hypothesis (Clary et al., 1998): that those volunteers who experienced a match between their motivations and benefits would also report higher levels of overall satisfaction and higher levels of intentions to continue mentoring in the future. The matching hypothesis received some support, as volunteers who rated motivations high and also reported that these motivations had been fulfilled tended to also have higher levels of satisfaction with their mentoring experience.

Several important implications of these findings for those organizing school-based mentoring programs follow. First, such programs should be

designed so that volunteers' motivations are addressed to provide a more satisfying mentoring experience. Second, more individuals may volunteer if their most important motivations are described as possible benefits from the mentoring experience. For example, advertising targeted to college-age students might mention career-related benefits that could result from school-based mentoring. Third, volunteers might be more easily retained if their initial motivations for mentoring were fulfilled. During the initial interview, program coordinators could ask about their volunteers' motivations and discuss with them how they might be able to find fulfillment in these during the course of their mentoring experience. This could increase mentor satisfaction and retention. Finally, understanding the motives of the volunteers may open more meaningful discussions as to which school, student, and activities would be most appropriate for the mentor. For example, a volunteer motivated to mentor based on values might be better suited to an at-risk student in an inner city school, while a mentor motivated by the social function might be best suited to a larger school with several other mentors and frequent mentor meetings.

Although matching volunteer motivations with benefits had an impact on satisfaction, it did not heavily influence the volunteers' intentions to mentor in the future, as most of the volunteers reported that they would mentor again. In fact, 77% of the volunteers in the study participated again the following year. This could be explained by the fact that volunteers in the current study were encouraged to have high levels of commitment to their student and to mentor the same student into the next school year. Thus if the mentoring experience did not fulfill a volunteer's expectations, they may have continued to mentor because of the commitment and/or concern for the student. This phenomenon may not be true for more transient opportunities such as volunteering at a hospital or performing other community service, as was the found by Clary et al. (1998). Additional research could seek to investigate the matching hypothesis in other school-based mentoring programs.

Volunteers experienced several benefits of school-based mentoring, as evidenced by their high post-survey ratings on the enhancement, social, values, and protective functions. That the volunteers found the experience of school-based mentoring to be quite rewarding is consistent with the reports of other researchers (Karcher, 2009; Trepanier-Street, 2007), and may account for their tendency to continue to volunteer even though their specific motivations to mentor may not have been fulfilled. An important implication of these findings is that volunteers may receive unanticipated benefits from mentoring that result in their continued desire to mentor. Becoming aware of these benefits may further increase their motivation to continue to serve as a mentor. Mentoring has been viewed more as a relational partnership and less as a hierarchical structure (Kafai et al., 2008), as the volunteers can also have learning experiences, feel good about them-selves, develop knowledge and skills, and express important values.

Funding agencies may be more motivated to support school-based mentoring if they realize that both the mentors and students are benefiting from the experience (Evans, 2005).

Finally, the impact these findings may have on the students being mentored should be noted. Research in school-based mentoring has primarily focused on improving the well-being of the students being mentored. Although this study addressed the benefits of mentoring for the adult volunteers, it is assumed that a satisfying experience for the volunteers will affect their relationships with the students, yielding a better mentoring experience for all. Recruiting and retaining more volunteers also makes it possible to have longer and more positive mentoring relationships. Research could further investigate the benefits of school-based mentoring for the adult volunteers, specifically the impact on the mentoring relationship and the outcomes for students being mentored.

Limitations

Limitations of this study should be acknowledged. First, the sample was relatively small, as it is often difficult to recruit and track a high volume of school-based mentors. Second, the study was conducted in elementary schools in just one school district in the United States and was limited to a predominately middle class, suburban area. Third, this study followed volunteer mentors for one school year and did not continue to track the experiences and attrition rates of the volunteers into the future. A final limitation was the adaptation of the VFI and post-survey to the context of mentoring, as these surveys were primarily designed for volunteering in general. The results of this study should be considered preliminary pending replication in other school-based mentoring programs.

Conclusions

The results of this study make a contribution to the literature regarding the motivations of volunteers and the benefits received by school-based mentoring. Preliminary support was found for the idea that volunteers tend to be motivated to mentor in order to express important values or gain greater understanding. Second, perhaps not surprisingly, volunteers whose motivations to mentor were fulfilled appear to be more satisfied with their mentoring experience. Third, support was found for the idea that school-based mentoring results in a number of benefits to the volunteer mentors, some of which may be unanticipated by the volunteers prior to their participation in the program. Finally, although this study addressed the benefits of mentoring for the adult volunteers, it is assumed that a satisfying experience for the volunteers will positively affect their relationships with students resulting in better outcomes. It is hoped that the findings and implications of this study may prove useful to mentoring program directors, researchers, and policy-makers in recruiting and retaining volunteers, thereby promoting potentially more beneficial relationships with students.

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Paul Caldarella, Ph.D., is director of Brigham Young University Positive Behavior Support Initiative and associate professor in the counseling psychology and special education department. He is both a clinical and school psychologist. His research interests include assessment and intervention for at-risk youth.

R. Jeff Gomm, B.S., is a graduate student in the Brigham Young University School Psychology program. His research interests include school-based mentoring, and bibliotherapy for student grief or loss.

Ryan H. Shatzer, Ph.D. is a recent graduate of the Brigham Young University Psychology department. His research interests have focused on positive behavior support in schools and school leadership.

D. Gary Wall, Ed.D., is a research associate at Brigham Young University Positive Behavior Support Initiative and an adjunct professor in educational leadership at Western Washington University. He formally served as a public school teacher, principal, and district superintendent.

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Appendix A

Volunteer Functions Inventory (VFI) Items Adapted to Mentoring

Motivations

Values

3. I am concerned about those less fortunate than myself.

8. I am genuinely concerned about the particular child I am mentoring.

16. I feel compassion toward people in need.

19. I feel it is important to help others.

22. I can do something for a cause that is important to me.

Understanding

12. I can learn more about the cause for which I am working.

14. Mentoring allows me to gain a new perspective on things.

18. Mentoring lets me learn things through direct, hands on experience.

25. I can learn how to deal with a variety of people.

30. I can explore my own strengths.

Social

2. My friends serve as mentors.

4. People I'm close to want me to serve as a mentor.

6. People I know share an interest in community service.

17. Others with whom I am close place a high value on community service.

23. Mentoring is an important activity to the people I know best.

Career

1. Mentoring can help me to get my foot in the door at a place where I would like to work.

10. I can make new contacts that might help my business or career.

15. Mentoring allows me to explore different career options.

21. Mentoring will help me to succeed in my chosen profession.

28. Mentoring experience will look good on my resume.

Protective

7. No matter how bad I've been feeling, mentoring helps me to forget about it.

9. By mentoring I feel less lonely.

11. Serving as a mentor relieves me of some of the guilt over being more fortunate than others.

20. Mentoring helps me work through my own personal problems.

24. Mentoring is a good escape from my own troubles.

Enhancement

5. Mentoring makes me feel important.
13. Mentoring increases my self-esteem.
26. Mentoring makes me feel needed.
27. Mentoring makes me feel better about myself.
29. Mentoring is a way to make new friends.

Appendix B

Post-survey Items Adapted to Mentoring

Benefits

Values

1. I was able to express my personal values through my service as a mentor.

Understanding

2. I learned something new about the world by serving as a mentor.

Social

3. The mentoring service I provided was appreciated.

Career

4. I learned some skills that will be useful in my future career by serving as a mentor.

Protective

5. Serving as a mentor allowed me to think about others instead of myself.

Enhancement

6. I gained a sense of accomplishment from my service as a mentor.

Satisfaction

7. On the whole, the mentoring experience was very positive for me.
8. I was personally very satisfied with the responsibilities given to me as a mentor.
9. I don't think I got anything out of the mentoring experience.

Intention

10. I will be a mentor 1 year from now.
11. I will be a mentor 3 years from now.
12. I will be a mentor 5 years from now.

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Prospective Turkish elementary science teachers' knowledge level about the greenhouse effect and their views on environmental education in university

Mustafa KIŞOĞLU*
Aksaray University, Turkey

Hasan GÜRBÜZ
Atatürk University, Turkey

Mehmet ERKOL
Atatürk University, Turkey

Muhammed Said AKAR
Erzincan University, Turkey

Mustafa AKILLI
Atatürk University, Turkey

Abstract

The fundamental factor of environmental education is teachers who are well-informed about environmental issues. This research aimed to determine prospective Turkish elementary science teachers' knowledge level about causes, consequences and reducing of the greenhouse effect and to investigate the effect of gender, information source and membership in the environmental foundations on their knowledge. We also aimed to learn their views on environmental education given in university. Twenty-six Likert-scale items developed by Cin (2006) were used for data collection. The scale was applied to 215 prospective teachers from two universities in eastern Turkey. Results indicated that the majority of prospective teachers had misunderstandings about causes, consequences and reducing of the greenhouse effect. According to the analysis of demographic variables, there were significant differences in participants' mean scores based on gender and information sources. Additionally, prospective teachers found environmental education inadequate for different reasons.

Keywords: Environmental education, greenhouse effect, knowledge level

* E-mail for correspondence: mkisoglu@hotmail.com

Introduction

There has been an increasing awareness of environmental problems for their effect of human-life all over the world. One of the most acknowledged environmental problems is global warming, especially that aspect known as the greenhouse effect. The greenhouse effect is a natural phenomenon that makes earth habitable. Some of the short wave rays that penetrate the earth are re-radiated as long wave rays. This long-wave infrared light in the form of heat energy is absorbed by the atmospheric greenhouse gases, such as carbon dioxide, water vapour, nitrous oxide, methane and other gases, present in the earth atmosphere and this trapped heat raises the earth's temperature (Khalid, 1999). Without greenhouse effect, the temperature of the earth surface would be 16 degrees Celsius on average (US Department of Energy, 1995). This temperature is not suitable for any species to live. In fact, this warming is essential for life in the Earth (Boyes & Stanisstreet, 1993).

According to the National Academy of Sciences, the Earth's temperature has risen about approximately 0.5 degrees Celsius in the past century, with accelerated warming during the past two decades (Baird, 2005). This unnatural warming has become a potential threat to our biosphere with huge social, environmental and economic consequences (Papadimitriou, 2004). In the special report about global warming published by the Intergovernmental Panel on Climate Change, it is indicated that the key factor of global warming is human influence which is increasing the concentration of greenhouse gases in the atmosphere, primarily carbon dioxide, methane and nitrous oxide (IPCC, 1997). For this reason, there has been lately a great interest in educating pupils, the future citizens, about global warming, especially the greenhouse effect, all over the world (Koulaidis & Christidou, 1999). However, studies conducted on students' ideas about greenhouse effect revealed that students almost every level have misunderstandings about the greenhouse effect (Andersson & Wallin, 2000; Boyes & Stanisstreet, 1993; Bozkurt & Cansüngü-Koray, 2002; Darçin et al., 2006; Rye et al., 1997). Some of these misunderstandings are:

- If the greenhouse effect gets bigger, more people will get food poisoned.
- If the greenhouse effect gets bigger, more fish will be poisoned in the rivers.
- If the greenhouse effect gets bigger, more people will get skin cancer.
- If the greenhouse effect gets bigger, there will be more earthquakes.
- The greenhouse effect is made worse by acid in the rain.
- The greenhouse effect is made worse by holes in the ozone layer.

- The greenhouse effect can be made smaller by using unleaded petrol.
- The greenhouse effect can be made smaller by reducing the number of nuclear bombs in the world.

According to Loughland et al. (2003), the gender difference is one of the important factors influencing young people's conceptions of the environment and environmental problems. Therefore, findings about different environmental studies with respect to gender are one of the concerns to be tackled (Fernandez-Manzanal et al., 2007; Tuncer et al., 2005; Zelezny, 2000). In their study into the environmental attitudes of young people in Turkey, Tuncer et al. (2005) found that girls were more aware of environmental problems, individual responsibility and national environmental problems, and that they had more positive attitudes toward the solutions to the environmental problems. Thus, we have taken gender as the factor affecting the prospective teachers' knowledge level about the greenhouse effect in the present study.

Environmental education is a life-long period not limited only official curriculum of formal education and it is influenced by informal, out of school, factors. One of the informal factors is information sources used to gain knowledge about the environmental issues like the media (Coyle, 2005). Although environmental problems have received sporadic attention in the popular media, the media is responsible for some misconceptions about environmental issues like greenhouse effect (Jeffries et al., 2001). According to Hillman et al. (1996), learning from media is unidirectional and, therefore, children might misinterpret information for not having opportunity to test their ideas against those of their peers and seniors. Another informal factor that influences the environmental education is environmental organizations that aim to improve students' environmental knowledge, attitudes and practice (Ajiboye & Silo, 2008). The results of some studies indicate that students do not participate in the environmental organizations (Çabuk & Karacaoğlu, 2003) and these organizations had no effect on students' environmental average knowledge (Uzun & Sağlam, 2007). For this reason, the formal educational system is regarded as an effective way of developing students' awareness and understandings of environmental issues (Roth, 1992).

In formal, school-based environmental education, teachers have an important role in providing students an adequate knowledge base and clear understanding of environmental problems (Khalid, 2001). Groves & Pugh (1999) stated that students' misunderstandings might arise from incorrect understandings passed along by their teachers. Recent researches in environmental education support the idea that teachers have poor understanding of the actual environmental problems, especially the greenhouse effect (Michail et al., 2007; Summers et al., 2000). Therefore, it is necessary to educate prospective teachers who incorrectly understand

causes, consequences and reducing of major environmental problems such as the greenhouse effect. But, previous studies in different countries have indicated that student teachers have many misunderstandings relating to the greenhouse effect (Groves & Pugh, 1999; Khalid, 2001, 2003; Papadimitriou, 2004). These inaccurate knowledge and misunderstandings stated in the relevant studies show that environmental education in teacher training programs is not adequate and do not properly educate prospective teachers about environmental issues. Research revealed that prospective teachers' misunderstandings about the greenhouse effect persisted even after the intervention (Groves & Pugh, 2002). According to studies, some inadequacies that cause misunderstandings about environmental issues are the lack of appropriate environmental courses, insufficient knowledge about environmental issues in the course books and notes, not using student-centred teaching methods in the classrooms (Khalid, 2001; Pekel, 2005). Khalid (2001) stated that to eliminate prospective teachers' misunderstandings about environmental issues, the inadequacies of environmental education in teacher training programs should be determined and improved.

The Significance of the Study

There are limited studies conducted on Turkish prospective teachers' knowledge level about the greenhouse effect (Bal, 2004; Cin, 2006). In these studies, some misunderstandings detected by international researchers (Groves and Pugh, 1999; Khalid, 2001; Khalid, 2003; Papadimitriou, 2004) were reported but the inadequacies of environmental education that cause these misunderstandings were not mentioned. Therefore, in the present study, we aimed to examine prevalence of misunderstandings about the greenhouse effect among the prospective science teachers in two Turkish universities and aimed to learn inadequacies of environmental education given in teacher training programs at Turkish universities according to views of prospective teachers.

Purpose

The purpose of the study is to determine prospective Turkish science teachers' misunderstandings about the causes, consequences and reducing of the greenhouse effect and to learn prevalence of these misunderstandings among the prospective elementary science teachers in two Turkish universities. It is also aimed to analyze the effect of gender, information sources and membership in environmental foundations on their knowledge about the greenhouse effect. Additionally, the third purpose of the study is to identify the inadequacies of environmental education in teacher training programs according to views of prospective teachers and to make recommendations to improve them. The following questions directed and shaped the study;

- What are the prospective Turkish science teachers' misunderstandings about the causes, consequences and reducing of the greenhouse effect?
- Are these misunderstandings similar to previous limited study conducted in other Turkish universities?
- What is the effect of gender, information sources and membership in environmental foundations on prospective science teachers' knowledge about the greenhouse effect?
- What are the inadequacies of environmental education in teacher training programs at Turkish universities according to views of prospective science teachers?

Method

Research Approach

In this study, quantitative and qualitative approaches were used together as the research methodology. In the quantitative section, the data concerning prospective teachers' knowledge level about greenhouse effect was collected by using survey research method. Surveys provide to learn about people's demographics, opinions, ideas and other types of information. It is frequently used in education studies because accurate information can be obtained for large numbers of people with a small sample (McMillan & Schumacher, 2006). Qualitative data were collected by using one open-ended question to learn prospective teachers' views about environmental education program they had taken in university.

Sample

The sample of the study was 215 third and fourth years' prospective science teachers from science education departments of two large universities in eastern Turkey. There were two reasons for choosing this population for data collection. First, they have taken at least one course continued a semester long about environment. Second, they would begin their professional career as elementary science teachers in about one to one and a half years. There were 96 (44.7%) female and 119 (55.3%) male participants in the study.

Data Collection

The study was conducted by means of a questionnaire (see Appendix). The questionnaire consisted of two parts. The first part included demographic questions dealing with gender, information sources about the greenhouse effect and membership in any environmental organizations. The students were also asked whether or not they found the environmental education program they took were adequate. If students' answer to this question was "No", then, we wanted them to explain why they thought so. For this purpose, prospective teachers were given an open-ended question (Why do you think the environmental education program you take is not adequate?)

and they were asked to answer it. In the second part of questionnaire, a survey instrument developed by Cin (2006) was used to learn prospective teachers' knowledge level about the greenhouse effect. The instrument consisted of 26 statements, 11 were regarding the causes of the greenhouse effect, 9 were about consequences of the greenhouse effect and 6 statements were about the reducing of the greenhouse effect. The students had three choices to respond to each survey statements: "I agree", "I do not agree" and "I am not sure". The pilot data were collected with 41 students and reviewed to determine the reliability coefficient of the questionnaire. Cronbach's alpha (α) of the instrument was calculated as 0.83. For construct validity, experienced faculty members from biology, environmental science and science education critically reviewed the instrument. As a result of the review, the instrument was administered without any changes.

Data Analysis

The results were evaluated by using SPSS package program. Prospective teachers' percentages and frequencies of answers were calculated and the misunderstandings that prospective science teachers had were presented. Independent samples t test analysis was used for gender and membership effect on prospective teachers' misunderstandings. To analyze the effect of information source on prospective teachers' knowledge about the greenhouse effect, LSD-ANOVA analysis was used. Qualitative data were analyzed by open coding technique and the conceptions were interpreted in terms of determined categories and conceptual constructions. Open coding refers to naming and categorizing phenomena through close examination of the data (Strauss & Corbin, 1990). Open coding fractures data into concepts and categories. Then data were compared and similar incidents were grouped together and given the same conceptual label (Smit, 2002). In the analysis process, prospective teachers' views about inadequacy of environmental education program they took were reviewed by two faculty members and phenomenon were determined, named and categorized. After the review process, five categories were identified according to prospective teachers' views.

Results

Analysis of the prospective science teachers' answers to statements in the questionnaire revealed some of the misunderstandings stated as follows about the causes, consequences and reducing of the greenhouse effect.

Misunderstandings about causes of the greenhouse effect

Prospective science teachers' misunderstandings about the causes of the greenhouse effect are presented in Table 1. About 66.5% of prospective teachers affirmed the description of the mechanism of the greenhouse effect that extreme Sun's rays get to the Earth's surface (#1). Only 20 % correctly responded to the statement. Boyes & Stanisstreet (1993) suggested that students appreciated that solar radiation plays a part in global warming, but did not fully understand the idea of energy entrapment by atmospheric

conditions. Additionally, response to #4 indicates that prospective teachers confuse the greenhouse effect with ozone layer depletion. About 74% of prospective teachers think that holes in the ozone layer cause the greenhouse effect whereas only 12% know ozone layer is not related to the greenhouse effect. This result parallels the problem found by Khalid (2001) that students teacher tend to lump greenhouse effect and ozone depletion together.

Most of the prospective teachers believe that there is a connection between solid waste and the greenhouse effect. About 61.4% agreed on the statement that "solid waste (unspoilt waste) increases the greenhouse effect" (#5). Only 7.4% know that unspoilt waste do not produce the greenhouse gases. In the study of Cin (2006), 94 prospective teachers, incorrectly, affirmed this statement.

One of the prospective teachers' problems is nuclear stocks and the greenhouse effect. Only 7.4% of prospective teachers appreciated that nuclear stocks do not increase the greenhouse effect (#6). About 59.1% had confusion between an increase in the greenhouse effect and nuclear stocks. Groves & Pugh (1999) and Bal (2004) reported that many of prospective teachers incorrectly connected radioactive waste with the greenhouse effect.

Table 1. *Students' misunderstandings about the causes of the greenhouse effect*

#	Statement	Agree (%)	Do not agree (%)	Not sure (%)
1	The greenhouse effect is to get much more sun's rays to the earth's surface.	66.5	20	13.5
4	Hole in the ozone layer causes the greenhouse effect.	74	14	12
5	Solid waste (unspoilt waste) increases the greenhouse effect.	61.4	7.4	31.2
6	Nuclear stocks increase the greenhouse effect.	59.1	7.4	33.5

Misunderstandings about consequences of the greenhouse effect

Prospective teachers have two misunderstandings about the consequences of the greenhouse effect (Table 2). Statements dealing with consequences revealed considerable confusion over the relationship of the greenhouse effect to skin cancer. A rather high percentage (73.5%) of prospective teachers believed that the greenhouse effect will increase chances of getting skin cancer (#14). Only 4.7% knew skin cancer deals with ozone depletion. Groves & Pugh (1999) and Khalid (2001) stated in their studies that majority of the prospective teachers believed the skin cancer was a result of the greenhouse effect.

Most of the prospective teachers (42.3%) accepted the statement that "Negative results of the greenhouse effect will be felt in equator at most."

(#15). Only a small group of prospective teachers (12.6%) disagreed with the statement. Greenhouse warming will be felt more in countries located on the equator than at each of the poles. The most important reason for this fact is that lives in poles cannot accommodate to this warming (Cin, 2006).

Table 2. *Students' misunderstandings about the consequences of the greenhouse effect*

#	Statement	Agree (%)	Do not agree (%)	Not sure (%)
14	The greenhouse effect will cause more people to get skin cancer.	73.5	4.7	21.8
15	Negative results of the greenhouse effect will be felt in equator at most.	42.3	12.6	45.1

Misunderstandings about ways to reduce the greenhouse effect

Responses of prospective teachers indicated that many students did not understand the practical actions which could be taken to reduce the greenhouse effect (Table 3). Prospective teachers did not realize that there was no causal link between the greenhouse effect and feeding (#25). Most of the prospective teachers (46.5%) had no idea about reducing starvation would reduce the greenhouse effect whereas 42.8% knew they were not related to each other. Only 10% mistakenly thought that reducing starvation would reduce the greenhouse effect. This result is similar to findings of Jeffries et al. (2001) showing that there is little confusion between an increase in the greenhouse effect and reduction of global starvation among college students.

A high proportion of prospective teachers (57.2%) thought that the use of unleaded petrol would help to reduce the greenhouse effect (#26). Only 5.6% responded correctly to this statement. Groves & Pugh (1999) reported in their research that 13% of prospective teachers appreciated that the unleaded petrol did not help to reduce the greenhouse effect.

Table 3. *Students' misunderstandings about the ways to reduce the greenhouse effect*

#	Statement	Agree (%)	Do not agree (%)	Not sure (%)
25	Reducing starvation reduces the greenhouse effect.	10.7	42.8	46.5
26	Using unleaded petrol reduces the greenhouse effect.	57.2	5.6	37.2

Effect of gender, information sources and membership in environmental organizations

As determined by independent samples *t* test, there were statistically significant differences between students' gender in mean scores of the questionnaire (Table 4). Female prospective teachers' mean scores were significantly higher than males in total of the questionnaire.

Table 4. *Prospective teachers' gender differences in mean scores of the questionnaire*

Gender	*N*	*M*	*SD*	Difference	*t*
Female	96	2.62	0.22	0.11	3.459**
Male	119	2.52	0.23		

$p < .001^{**}$

Analysis of information source for greenhouse effect showed that participants were mostly used visual and written media (T.V.-radio, newspaper-magazines) and internet. Formal based information sources such as course book and lecturers were not frequently used by the prospective teachers (Table 5).

Table 5. *Prospective teachers' information sources for the greenhouse effect*

Information Source	*N*	*M*	*SD*
Magazine-Newspaper	49	2.62	0.19
T.V.-Radio	64	2.51	0.19
Internet	43	2.58	0.27
Course Book	19	2.46	0.30
Friends	19	2.54	0.25
Lecturer	21	2.62	0.17

ANOVA analysis indicated that there was a statistically significant difference between the mean scores of participants using different information sources ($p < .05$) (Table 6).

Table 6. *Results of ANOVA analysis for information sources*

	Sum of Squares	*df*	Mean Square	*F*	*p*
Between Groups	.630	5	.126	2.293	.039
Within Groups	11.011	209	.053		
Total	11.642	214			

$p < .05$

According to the LSD-ANOVA analysis, there was a statistically significant difference among the mean scores of prospective teachers using course book, magazine-newspaper and lecturer as information source ($p < .05$). Statistical LSD test results indicated that using magazine-newspaper ($M = 2.62$) and lecturer ($M = 2.62$) were more successful than using course book ($M = 2.46$). Also, a significant difference was detected between prospective teachers using magazine-newspaper and TV-radio as information source ($p < .05$). Mean of using magazine-newspaper ($M = 2.62$) was higher than mean of using TV-radio ($M = 2.51$).

According to findings about the membership, 19 prospective teachers (8.8%) were members in environmental organizations. But, 196 prospective teachers (91.2%) were stated that they did not have membership in any environmental organizations. In the study of Özmen et al. (2005), most of the university students stated they had no membership in any environmental organizations. According to Independent samples t-test result considering the membership in any environmental organizations, no significant difference is found between students in mean scores ($t(213) = .421$, $p > .05$). This finding is similar to result found by Uzun & Sağlam (2007) that there were no significant differences between students' environmental knowledge average based on active participation in the voluntary environment organizations.

Inadequacies of environmental education according to prospective teachers

Prospective teachers' views about the environmental education program they took indicated that while 96 participants (44.7%) found environmental education adequate, 119 participants (55.3%) stated they found environmental education program inadequate. Prospective teachers' answers about inadequacies of environmental education program were evaluated in five categories.

- Gaining insufficient information about environment.
- Environmental insensitivity of lecturers.
- Scarcity of courses about environment.
- Using traditional teaching method in courses.
- Lacking outdoor activities.

Most of the prospective teachers (N = 44, 36.9%) expressed that environmental education they took was not adequate for the courses about the environment. For 24 (20.1%) prospective teachers, the reason for the inadequacy of environmental education is to gain insufficient information from books, notes etc. about the environment. Additionally, 22 (18.4%) prospective teachers think that lecturers were insensitive towards the environment. Furthermore, 20 (16.8%) prospective teachers' reason for inadequacy is to be used traditional teaching method in the lesson. According to a small group of prospective teachers (N = 9, 7.5%), environmental education is not adequate for lack of outdoor activities (Table 7).

Table 7. *Prospective teachers' views about inadequacy of environmental education program they took*

Inadequacies of environmental education program	*N*
gaining insufficient information about environment	24
environmental insensitivity of lecturers	22
scarcity of courses about environment	44
using traditional teaching method in courses	20
lacking of outdoor activities	9
Total	119

Some quotes of prospective teachers' answers were given below.

"...there are not enough courses about environment in our training program. We took only two courses about environment and it is not enough for constructing positive attitudes toward environment."

"...information about environmental problems in our books is very superficial. Also, we cannot gain detailed information from our notes. So, we have to gain information about environment and environmental problems from out of school source like internet, magazine etc."

"...it is aimed to construct high environmental attitudes toward environment but as far as I am concerned, our lecturers' attitudes toward environment are low. Because they advise us something to protect the environment like using public transportation, however; they do not do what they advise."

"...lecturers only give information about environmental problems and we memorize them. A few months later, we forget this knowledge. I think, it will be better if we become active in environmental courses and investigate into the environmental problems."

"...as far as I am concerned, the environmental education should be given in nature. For example, we can take environmental course in a forest or near a lake. I think, it will be more effective."

Discussion

The results indicate that prospective teachers graduate from the university having many misunderstandings concerning the greenhouse effect which can be summarized as follows:

- The greenhouse effect is to get much more sun's rays to the earth's surface.

- Holes in the ozone layer cause the greenhouse effect.
- Solid waste (unspoilt waste) increases the greenhouse effect.
- Nuclear stocks increase the greenhouse effect.
- The greenhouse effect will cause more people to get skin cancer.
- Negative results of the greenhouse effect will be felt in equator at most.
- Reducing starvation will reduce the greenhouse effect.
- Using unleaded petrol will reduce the greenhouse effect.

These misunderstandings are similar to previous limited studies conducted on prospective teachers' views about the greenhouse effect in other Turkish universities (Bal, 2004; Cin, 2006). This result shows that the majority of prospective teachers in Turkey have the same misunderstandings about the greenhouse effect and graduate from universities with these misunderstandings.

One remarkable misunderstanding of the study is that prospective teachers confuse greenhouse effect with ozone layer depletion. According to Cin (2006), the reason for this confusion is that two environmental problems have common features; both deal with sunlight and the result of atmospheric pollutions. This can cause prospective teachers to conflate cause and affect relationship of these two environmental issues. These similarities of two environmental problems cause teachers and students to adopt simplistic mental models for these issues. Groves & Pugh (2002) described simplistic models as cognitive illusions which hinder the development of correct understanding of complex issues in science.

According to our study, several reasons for presence of these misunderstandings among the prospective teachers can be suggested. One reason focuses on the role of the information sources about the greenhouse effect. Prospective teachers in our study stated that they mostly used printed and visual media, magazine-newspaper, television-radio and internet, to gain knowledge about the greenhouse effect instead of formal sources such as course book and lecturer and it can contribute to the development of misconceptions (Adler, 1992). For example, most of prospective teachers think that using unleaded petrol will reduce the greenhouse effect (#26). Unleaded petrol takes part in the media with its green image and associated environmentally friendly propaganda. Thus, students think unleaded petrol is for the environment compared to the leaded petrol (Boyes & Stanisstreet, 1993). Similarly, Khalid (2001) stated that the reason why everyone knew carbon dioxide as the only greenhouse gas was that other gases (e.g. Methane, nitrous oxide) were not discussed in the media. Surprisingly, the prospective teachers who use magazine-newspaper and their lecturer as information source for the greenhouse effect have the highest mean score. Coyle (2005) stated that there is the more superficial coverage of environmental issues in the media which produces

familiarity, rather than deep understanding. This familiarity can raise the prospective teachers' mean scores.

Another reason for these misunderstandings held by prospective teachers can be inadequate environmental education program which is implemented in teacher training program. According to participants, the environmental education program they took was not adequate. The most frequently cited reason why their environmental education program was inadequate was the scarcity of courses about the environment. Indeed, participants of this study take only two courses which are two-hour classes (Environmental chemistry and environmental health) during their teacher education. Khalid (2001) stated that prospective teachers, who take one or two courses, do not get the whole content and have misunderstandings about the environmental issues.

Furthermore, prospective teachers find environmental education inadequate for being used traditional teaching methods. According to Lord (1999), one reason for the misconceptions held by students is science classroom instruction. He suggested that teacher-centred teaching method cause students not to retain the information they learn. Meadows and Wiesenmayer (1999) suggested using innovative teaching methods such as constructivism in environmental class for eliminating students' misconceptions about environmental issues.

Besides, participants of the study indicated that they did not gain sufficient information from their books. According to Pekel (2005), little information about environmental issues in course books and notes causes the confounding of one environmental problem with others. This also explains that prospective teachers erroneously tend to relate ozone layer depletion to the greenhouse effect. Furthermore, it can be the reason why course books are the least using information source by prospective teachers (Table 5).

The t-test result showed that females reported higher mean scores on the items in the survey than the males in the study. This result coincides with the findings obtained by Tuncer et al. (2005) and Fernandez-Manzanal et al. (2007). According to Fernandez-Manzanal et al. (2007), one interpretation of this phenomenon is based on the fact that in social aspects and collective actions women tend to display a higher level of commitment and responsibility than men. Therefore, the females are more informed and sensitive about the environment and environmental problems.

Most of the prospective teachers have no membership in any environmental organizations and there is no significant difference between prospective teachers' mean scores based on membership in environmental organizations. Environmental organizations aimed to educate people and to increase the environmental awareness about environmental problems among the community (Ajiboye & Silo, 2008). But, most of the environmental organizations in Turkey study on general environmental

pollution. The number of environmental organizations which study special problems, such as global warming, ozone depletion, is not enough (Duru, 1995). Therefore, the number of environmental organizations which study special environmental problems such as greenhouse effect, ozone layer depletion should be increased and made a part of environmental education program in teacher education.

On the other hand, it appears that Turkish prospective teachers, in our sample, have a good understanding of some aspects of the greenhouse effect. For example, they seem aware that burning fossil fuels, increasing in deforestation and releasing too much carbon dioxide increase the greenhouse effect. It also well known that increase in the greenhouse effect can result in weather patterns, more flooding and disappearing in some species. Most of prospective teachers understood the roles of saving electricity, using of recycled paper and renewable sources of energy to alleviate the greenhouse effect.

Suggestions

The misunderstandings regarding the environmental issues held by prospective teachers raise some concerns because they will begin their professional career very soon (Pekel, 2005) and they can reflect their misunderstandings to their students. To improve the knowledge level of pre-service teachers and eliminate their misunderstandings, some changes which are summarized as follows should be made in teacher education programs:

- Number of the courses about the environment should be increased in teacher education programs.
- Student-centred methodologies (such as classroom discussions) should be used in the environmental education (Littledyke, 1996).
- The difference in the causes and consequences of different global problems in environmental class should be emphasized.
- Information about environmental issues in books and notes used in environmental education programs in teacher training should be given in more detailed.
- Outdoor activities such as visiting places where water is purified should be made in environmental education of prospective teachers (Papadimitriou, 1996).
- Environmental organizations should be introduced to students and be made students participate in these foundations (Uzun & Sağlam, 2007).

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Mustafa Kışoğlu is a research assistant in the Department of Elementary Education at Aksaray University. Dr. Kışoğlu specializes in biology education, environmental education, science education and teacher training. E-mail:mkisoglu@hotmail.com

Hasan Gürbüz is an associate professor in the Department of Science and Mathematics Education in Atatürk University. His research interests are ecology, biology, water quality, hydrobiology and biology education.

Mehmet Erkol is a research assistant in the Department of Science and Mathematics Education in Atatürk University. He specializes in learning by inquiry, instructional methods based on constructivist theory and physics education.

Muhammed Said Akar is a research assistant in the Department of Elementary Education at Erzincan University. His research interests are science education, teacher training, writing skills and analogy.

Mustafa Akıllı is a research assistant in the Department of Elementary Education at Atatürk University. He specializes in teacher training and science education.

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Appendix

INSTRUMENT

PERSONAL INFORMATION

1- Gender

( ) female
( ) male

2- Information source about the Greenhouse Effect

( ) newspaper-magazine
( ) T.V.-radio
( ) internet
( ) lesson book
( ) friend
( ) lecturer

3- Do you think the environmental education program you take in university is adequate?

( ) yes
( ) no
If your answer is no, please explain why do you think the environmental education program you take is not adequate?
……
……
……
……
……
……
……
……
……
4- Do you have membership in any environmental organizations (foundation, association, student club e.t.c.)?

( ) yes
( ) no

QUESTIONNAIRE
[Developed by Cin (2006)]

No	Statements	Agree	Not sure	Do not agree
	Causes of the Greenhouse Effect			
1	The greenhouse effect is to get much more sun's rays to the earth's surface.			
2	Unconscious using of the environment by the people increases the greenhouse effect.			
3	Destroying the forest increases the greenhouse effect.			
4	Hole in the ozone layer cause the greenhouse effect.			
5	Solid waste (unspoilt waste) increases the greenhouse effect.			
6	Nuclear stocks increase the greenhouse effect.			
7	A rapid rising in population growth increases the greenhouse effect.			
8	Using fosil fuels increases the greenhouse effect.			
9	Diffusion of too much carbon dioxide in the atmosphere increases the greenhouse effect.			
10	Extensive volcanic eruptions increase the greenhouse effect.			
11	Solar explosions increase the greenhouse effect.			
	Consequences of the Greenhouse Effect			
12	Average temperature of the world will increase about 2 degrees Celcius a hundred years later because of the greenhouse effect.			
13	If the greenhouse effect gets bigger, the risk of the epidemic diseases will increase.			
14	The greenhouse effect will cause more people to get skin cancer.			
15	Negative results of the greenhouse effect will be felt in equator at most.			
16	If the greenhouse effect gets bigger, there will be more flooding in the world.			
17	Some animals and plants will disappear as a result of the greenhouse effect.			
18	If the greenhouse effect gets bigger, submergence risk of the digs in shoreline will increase.			
19	Clarities among the seasons will decrease as a result of the greenhouse effect.			
20	The greenhouse effect will cause both animals and plants to migrate.			
	Ways to reduce the Greenhouse Effect			
21	Saving electricity reduces the greenhouse effect.			
22	Using recycled papers more reduces the greenhouse effect.			
23	Using renewable energy resources reduces the greenhouse effect.			
24	Using public transport reduces the greenhouse effect.			
25	Reducing starvation reduces the greenhouse effect.			
26	Using unleaded petrol reduces the greenhouse effect.			

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An investigation of young children's perceptions of teasing within peer relationships

Debra HARWOOD*
Brock University, Canada

Sandra BOSACKI
Brock University, Canada

Kristina BORCSOK
Brock University, Canada

Abstract

The paper analyzed children's perceptions of teasing within their real world peer relationships through participants' drawings and accompanying narratives. The case study research was approached from an ethic of listening to children to discover and uncover children's perceptions and experiences with the phenomenon of peer teasing. Fifteen children from kindergarten to grade 2 participated in drawing and narrating their complex understandings of the multi-faceted aspects of peer teasing. The participants attended two 30-40 minute sessions of conversational interviews with the first session also involving drawing and narrating personal stories of teasing. The results of the study indicate the significance of teasing within the young peer relationship as well as several distinct perceptions and insights. Ultimately, these insights may help teachers to broaden curricular approaches within the school culture and enhance current theoretical conceptualizations of peer teasing.

Keywords: Teasing, early childhood, social-emotional development, visual methodology

Introduction

The perception of peer teasing as harmless play or a form of negative interaction is greatly debated in the literature. However, teasing as a social phenomenon has important implications for children's development as well as school culture. Teasing is a complex relational and social-emotional issue involving many elements such as social cognition, understanding of

* E-mail for correspondence: dharwood@brocku.ca

intention, pretense, non-literal communication, and emotional regulation (Keltner, Capps, Kring, Young, & Heerey, 2001). Yet despite the intent of the instigator, the impact of teasing is determined by the recipient (Drew, 1987) and how a child responds may directly impact subsequent teasing episodes. Thus, given the complexity and subtlety of teasing behaviour, such as the often nuanced intention of the instigator and the recipient's interpretation, it is no surprise that teasing is rarely addressed within educational research circles.

Exploring young children's perceptions of teasing within their real world peer relationships is a burgeoning direction for research. In this study, drawings and narratives provided the impetus for exploring the teasing experiences of the participating children. More importantly, the research team approached the project from an ethic of listening to children (Rinaldi, 2006) to illuminate children's thinking and experiences with the phenomenon of teasing within their peer relationships.

Defining Teasing

Young children's teasing incidents can range from prosocial affects (e.g., a game of 'king-of-the-castle') (Eisenberg, 1986) to more hostile and negative forms of social exchanges (e.g., name calling, tormenting, harassing, or verbal bullying) (Freedman, 2002). In previous studies, the definition of teasing has been closely aligned with antisocial forms of behaviour such as bullying (Aho, 1998; Lightner, Bollmer, Harris, Milich, & Scrambler, 2000). However, the *prosocial* aspects of teasing as evidenced in the research of Eisenberg (1986) (e.g. give-and-withdrawal games between a parent and their infant), and Schieffelin and Ochs (1986) may be discounted when the definition of teasing focuses solely on aggressive forms. And as Keltner, Capps, Kring, Young, and Heerey's (2001) review of the teasing literature indicated, prosocial teasing may serve as an impetus for encouraging and fostering positive interpersonal encounters. Thus, to avoid limiting the potential definitions provided by the children themselves the researchers in this study adopted a broad conceptualization of *teasing*. We aligned our thinking with Keltner et al.'s, (2001) definition and conceptualized teasing as encompassing three constructs, intentional provocations, playful off-record markers, and relevance to the recipient (p. 234).

In general, off-record markers are the contextual cues within a teasing scenario that help discriminate a tease from other forms of behaviours (e.g., sticking out one's tongue, laughter, sing-song chants). In a study by Drew (1987), linguistic off-record markers such as humorous phrases rhythmically placed in social routines, provided the cues to the non-serious nature of the interactions between adolescents. Intentional provocations can be construed as both nonverbal behaviours (e.g., physical imitation, making faces, singsong chants) or verbal statements (e.g., name calling, explicit statements). The provocation of the recipient is deliberate and can include behaviours or verbal statements that are intended to annoy,

frustrate, or incite a reaction from the target. The relevance of the content of the tease is determined by the target. For example, a red-haired child may find little personal relevance to being called 'Red' but react when called 'Carrot Top'. Children appear to demonstrate a capacity for teasing at a young age, and the peer relationships may provide an intimate view into what annoys the other.

Thus, by identifying the specifics of what constitutes teasing behaviour within an encompassing definition, the research team was better able to achieve the research goal of *listening to children's drawings*. As Dahlberg and Moss (2005) and Rinaldi (2006) advocate a 'listening pedagogy' means carefully and purposefully attending to the concerns and constructs of young children rather than imposing institutionally focused research goals (or agendas).

Thus from this 'listening pedagogy' perspective, understanding children's experiences with teasing as well as how they resist and internalize teasing messages in various contexts is noticeably absent from the research literature. The present study explored children's perceptions of teasing through the analysis of drawings and accompanying narratives. As Keltner, Young, Heerey, Oemig, and Monarch (1998) emphasized, "teasing lies on a perilous boundary between aggression and play and can increase intimacy and integrate members into groups or through subtle changes of form become a vehicle of victimization and ostracism" (p. 1244). Thus, understanding how children construct their own conceptions (thoughts and feelings) of this complex relational phenomenon is important in furthering the theoretical and curricular approaches specific to teasing.

Complexities of Teasing

Previous research on perceptions of teasing has traditionally targeted older elementary children in self-report studies (Shapiro, Baumeister, & Kessler, 1991; Warm, 1997). Physical appearance tends to be cited most often as the common content of teasing across several studies conducted with older children (Martlew & Hodson, 1991; Mooney, Creeser, & Blatchford, 1991; Scrambler, Harris, & Milich, 1998; Shapiro, Baumeister, & Kessler, 1991; Warm, 1997). Additionally, school age children tend to name reciprocation and playing or joking around most often as reasons for *why teasing occurs*' (Shapiro, et al., 1991).

Older school age children engage in more symbolic forms of teasing (e.g. calling a tall girl the green giant) while younger children tend utilize hurtful and physical forms of teasing more often (e.g. tying another's shoe laces together) (Warm, 1997). These hurtful forms of teasing tend to escalate between grade 1 and grade 6, reaching its peak during the final year of elementary schooling (Warm, 1997). Moreover, teasing that is focused on norm violations (e.g., cross-gender play) also increase in prevalence as children mature (Keltner et al., 2001). In previous research with young pre-school age siblings, hurtful teasing was found to occur most often and

involve taunting behaviours (e.g., frightening another, taking away possessions, spitting) (Harwood, 2008). Perhaps, as children become increasingly aware of the subtleties of the social context and expected behaviour within that context, so too does their ability to focus the content of teases on norm deviations. It is important to note that not all school age children report greater frequencies of antisocial teasing in school and home (Barnett, Burns, Sanborn, Bartel, & Wilds, 2004).

In Barnett et al.'s (2004) study of fifth- and sixth-grade children's perceptions of antisocial and prosocial teasing among peers, children reported experiencing and observing more prosocial teasing than antisocial teasing in the home and school. Here, children were able to differentiate and categorize teasing as hurtful, embarrassing teasing (antisocial), playful, or kidding around (prosocial). Additionally, children were rated as prosocial teasers more often by both peers and teachers. Thus, prosocial teasing may be more prevalent in children's lives than what is currently assumed. By focusing research attention solely on antisocial forms of teasing (i.e., as a form of bullying) the ways in which playful teasing manifests and contributes to positive interpersonal relations will remain unrequited.

Another important facet complicating the research on teasing is the role of the recipient's response. How an individual responds to teasing appears to be impacted by both personal teasing history and personality traits (Bollmer, Harris, Milich, & Georgesen, 2003). Additionally, it remains unclear whether gender differences exist. For example, did the girls of Barnett, Burns, Sanborn, Bartel, and Wilds (2004) study experience more antisocial teasing at school or "merely perceive the teases they receive at school as especially more aversive and antisocial" (p. 304)? Further research is needed on connections between other socialization processes (including various sociometric measures) on how one responds and perceives the efficacy of those response strategies.

Regardless, the *quality* of the response strategy appears to directly impact subsequent teasing episodes. Previous research has highlighted that children counter teasing with a variety of response strategies (Mooney, Creeser, & Blatchford, 1991; Shapiro, Baumeister, & Kessler, 1991) but the effectiveness of those responses is impacted by various aspects of the peer relationships such as social status (Irvin, Walker, Noell, & Singer, 1992; Walker, Colvin, & Ramsey, 1995) and personal history of both instigator and recipient (Scrambler, Harris, & Milich, 1998).

Additionally, considerable differences have been found between parental and child perceptions of the efficacy of various response strategies (Lightner et al., 2000). Lightner et al. found that children tended to evaluate the efficacy of responses to teasing based on their own teasing experiences. Additionally, children tended to report greater frequencies of teasing scenarios as occurring in their own lives than what was described by their parents. Conversely, parents tended to favour the *just ignore it* response and

were generally more lenient in their evaluation of the teaser. Previous research on teasing response strategies is limited to a few studies of videotaped teasing scenarios. Possibly the potentially artificial videotape staging of teasing constrains the evaluated effectiveness of response strategies that children identify and utilize within more naturalistic settings such as the school yard at recess. And given that a recipient's response may have a direct impact on the teasing scenario and the potential limitations of previous research, exploring how a child responds to peer teasing within natural contexts is an important aspect of this research.

Thus, the goal of this research was to explore children's perceptions of teasing more fully by *visualizing voice* through illustrations (Diaz Soto, 2005). As researchers we sought to understand how children 'experience the world' (Clandinin & Connelly, 2000) of teasing by providing participants the opportunity to express their experiences and understandings through a visual and narrative methodological approach (Sanders-Bustle, 2003). Images can provide an important conduit in making children's ideas explicit. The study provided a forum for children to express their understandings of the relational phenomenon of teasing both through drawings and conversations. The drawing aspect of the research project and the accompanying narratives that occurred during the drawing serve as the focus of this article.

Method

Pedagogy of Listening

In this study, children's perspectives were gathered utilizing a methodological approach of *listening*. Informed by children's rights discourse and the sociology of childhood, an *ethic of listening* recognizes the aptitude of the young child as competent "experts of their own experiences" (Clark, 2005, p. 508). Thus, *listening* is considered an active and dynamic participatory process of communicating, hearing, constructing and interpreting meanings through multiple sense making systems (Clark, 2005). As children can be afforded a 'hundred languages' to communicate (Edwards, Gandini, & Foreman, 1998), researchers and teachers can embrace approaches that foster a 'hundred ways of listening' (Clark, 2007).

Aligned with previous research of children's perspectives as expressed through drawings (Dockett, & Perry, 2005; Einarsdottir, Dockett, Perry, 2009), this study utilized children's illustrations as a means to access their perceptions and experiences with peer teasing. By providing familiar tools and materials (markers and paper) as well as a context where children could assume control (drawing), a non-confrontational atmosphere was created where children's preferences to communicate through various mediums (i.e., drawing and talking) was respected (Einarsdottir, Dockett, Perry, 2009). The following discussion details the specific strategies that were utilized.

Participants and Setting

Twenty-two children from grades kindergarten to grade two participated in this case study. The children ranged in age from 5 to 8 years (M=6.5; SD= 1.1). Two separate school locations were utilized in a middle socio-economic class neighbourhood in a city in eastern Canada. All the participating children were bilingual and attended Francophone before or after-school programs where they met with the primary researcher and a research assistant in small groups (the groups ranged in size from 2 to 7 children).

The before and after-school programs operated within a dedicated and purposefully built space within the two participating schools (although one program shared the school's gymnasium and library facilities). The programs provided care, play activities, homework tutoring, and guidance for multi-age groupings of children (kindergarten to grade 5). The programs were staffed by two or three licensed Early Childhood Educators (depending on attendance numbers). A variety of activities and play materials were provided and included art materials, snack, puzzles, books, building blocks, balls, dramatic play props, and assorted board games. Children were free to choose both their activity and playmates (one program upheld a policy of providing homework tutoring prior to self-chosen activities and free play).

All the children who participated in the study attended two 30-45 minute sessions with the researchers on two separate occasions. All sessions with the children were audio recorded and transcribed immediately following. The invitation to draw was made during the preliminary meeting with 15 children opting to do so (two 7-8 year old boys; four 7-8 year old girls; four 5-6 year old boys; five 5-6 year old girls). The second session was intended as a *member checking* meeting and the children were read summaries of the transcripts from the first session as well as provided with their original drawings and asked to provide any additions, deletions, changes, or clarifications. None of the children made any changes to their original drawings, but provided additional verbal examples of teasing, and added information on how a recipient should respond (e.g. the response "asking a friend to help" with teasing arose from the second session). In general, there was a consensus that the summaries accurately captured the children's perceptions elicited in the first visit. Moreover, children expressed a genuine enjoyment in participating in the second session by excitedly approaching the researcher, taking credit for statements read from the summaries, expressing pride in their drawings, and voicing to other children (who had not participated) "she's here to talk to me".

Throughout the study, children were afforded the "maximum freedom of choice" (Evans & Fuller, 1996, p. 17). Thus, the decision to participate in any of the conversations or the drawing aspects of the study was made by individual children (parental consent was also obtained prior to the onset of data collection). A verbal assent statement was read at the beginning of each session and again when the drawing activity was introduced. As other

activities were occurring simultaneously to the research session, the seven children who opted not to draw chose to return to these activities after the invitation to draw was made (these children opted to play in organized games in the gymnasium, eat snack, or engage in block building).

As researchers our goal was to explore children's perspectives of teasing, accordingly a drawing activity and guided conversational approaches were both utilized. The primary researcher conducted all conversations in English with the invitation for the children to respond in French if so desired. On four separate occasions children utilized French terminology for lunchroom (*sale à diner*), bullying (*taxage*), teasing (*taquinage*), and consequence (*conséquence*).

Materials and Procedure

Empowering children to speak of their own experiences and perspectives through the act of drawing can be an important aspect of research with young children. Although guided interviews with the participating children also occurred (discussion of the results of the interviews are beyond the scope of this article), it was the drawing aspect of the research that tended to free the children to express themselves from a personal perspective. As previous research has indicated, children's understandings and experience of world events as depicted in drawings (e.g. the events of 9/11) can be far different from adult perspectives, providing both an impetus for varied interpretations and new research directions (Diaz Soto, 2005).

Visual methods in research can also level the playing field and offer "accessible, flexible, and inclusive tools" (Burke, 2008, p. 25) that validate young children's voices in research foci of interest to their lives. This methodological approach proved meaningful such that children's feelings, personal histories, and experiences were interwoven into illuminating *stories of teasing*. Children were provided with art materials and invited to draw pictures about teasing. During the drawing activity, the primary researcher conversed with individual children as the visual representations unfolded.

The drawing aspect of this research invited children to become both the participant and co-researcher in the process. We believed it was important that the children maintained ownership of the direction of their drawings, thus no attempt was made to influence the drawing process. The initial instructions were kept simple and open-ended with the invitation made by the researcher for the children to *draw something about teasing*. Children were free to opt out of drawing or spend as much time as they wished engaged in the activity. Additionally, access to the resources was not limited and children could chose to draw multiple pictures and change their choice of drawing instruments frequently (multiple sets of primary colour washable markers were provided).

During the drawing sessions, the primary researcher conversed with the children and asked for clarifications and explanations of their drawings.

Often this helped to elucidate the researcher's interpretations (and misinterpretations) and identify aspects of the drawings such as context, gender, and whom the figures represented. The questions that guided the conversation during the drawing task included:

1. Tell me what is happening in your picture? Or what story is your picture is telling?
2. In your picture, how do you think the person doing the teasing feels?
3. What is the teaser thinking?
4. How do you think the child being teased feels?
5. What is he/she thinking?
6. Why is that girl/boy being teased and not someone else?
7. What do you think they are saying to themselves in their mind?
8. How would (your friend) feel if she/he were teasing you – what do you think they would be thinking in their mind?
9. What should he/she do?

Given the context of the drawing scenario that unfolded not all questions were utilized with each child. And regardless of the questions, we feel it was the ability to create empathetic and harmonious relationships with young children in a non-threatening context that was essential in encouraging children's talk and drawing about teasing within their peer relations. Previous experience as teachers of young children proved beneficial in establishing rapport and creating an atmosphere of trust with the result being uninhibited conversations during the school visits. The pictorial representations and narrations during drawing were added to the data set.

Response Coding of Drawings

Two sets of data were analyzed. The first set involved the narrative account of the participants' responses to a guided conversational interview. The second set, and focus of this article, involved a thematic analysis of the visual images the children created and accompanying stories. We employed an inductive process in analyzing the children's drawings, identifying common themes and elements in the drawings. Coding of the children's drawings combined Ely, Vinz, Downing, and Anzul's (1997) *themed* approach and methods more consistent with previous investigations of children's drawings (e.g. Tamm, 2000). By combing approaches, the research team sought to provide both a descriptive analysis of peer teasing as well as a snap shot of the "…close-up reality and 'thick description' (Geertz, 1973) of participants' lived experiences of, thoughts about and feelings for a situation" (Cohen, Manion, & Morrison, 2000, p. 182). From this perspective, we thought of themes as "brief statements that describe the content of individual units of data text" (Tesch, 1987, p. 231).

Individually, each of the three research members read and re-read the narratives and analyzed the drawings, identifying emerging themes. Aligned with Ely et al.'s (1997) approach, research team meetings were held

periodically throughout the analysis phase to discuss emerging themes and create links in the data. Once consensus among the three team members was reached and 14 themes were accorded, a manual was devised to guide the coding process that ensued. The coding manual clearly defined each theme as well as set parameters on the processes to be used during coding (e.g., including facial expressions of the children's drawings and the depiction of a sun, grass, clouds, trees as indicators of the context of where teasing was occurring within the drawing).

Separately, the primary investigator and a research assistant coded the drawings and narratives (stories) with the use of NVivo. The third research member acted as a consultant in the coding process and would have assumed a role as an arbitrator should disagreement ensue between the two primary coders. However, the Kappas for the various categories of codes for the drawings were averaged and resulted in K= 0.89, suggesting relatively high inter-rater reliability. Thus, the third researcher was not actively employed in the NVivo coding process.

Descriptive Results

Number of Characters

Primarily, the children's drawings depicted a teaser-recipient dyad (73%). Table 1 indicates that single-character depictions of teasing and multiple character depictions were less frequently portrayed. The number of characters depicted did not increase with age. Interestingly, it was the younger group of 5-6 year olds who were more likely to represent greater variability in the composition of characters with only 56% representing the dyad. The older group of 7-8 year old children consistently represented a teasing dyad (100%). This finding contrasts some of the bullying research which tends to suggest that bullying is a "complex social construct [that] incorporate other social and individual dynamics within the context of the school" (Cranham & Carroll, 2003, p. 128). Perhaps, teasing is more universal and not constrained by the same trajectories more inherent within bullying encounters.

Character Gender

In respect to the gender of the characters depicted in the children's illustrations there was a slightly greater tendency for the older group of children to depict same-sex teasing (83%) in their drawings than what was depicted in the younger children's drawings (75%). The male drawings were uniform in their portrayal of males as the instigators of teasing. Interestingly, regardless of age only the girls illustrated teasing scenarios as occurring between girls and boys with all three of these identifying a girl as the instigator of the tease. Overall, the girls identified females with greater frequency as the instigators of teasing (63%). This finding appears somewhat in contrast to previous research where males were identified as more frequent teasers (Barnett, et al., 2004) and may be more associated

with the distinct patterns of interpersonal behaviours for boy and girls (MacCoby, 1990).

Table 1. *Frequency distributions of number of characters represented in children's drawings by gender and age group*

Age & Gender $N = 15$	Number of Characters			
	Zero	One	Two	Three or more
	0	2 (13%)	11 (73%)	2 (13%)
7-8 year old	0	0	6 (100%)	0
Boys ($n = 2$)	0	0	2 (33%)	0
Girls ($n = 4$)	0	0	4 (67%)	0
5-6 year old	0	2 (22%)	5 (56%)	2 (22%)
Boys ($n = 4$)	0	1 (11%)	3 (33%)	0
Girls ($n = 5$)	0	1 (11%)	2 (22%)	2 (22%)
Total Boys	0	1 (17%)	5 (83%)	0
Total Girls	0	1 (11%)	6 (67%)	2 (22%)

Note: Numbers are the frequencies of children. Percentages represent proportion of children in that particular category.

Character Size

Mixed results were found in the depiction of character size in the 13 drawings of a teasing dyad (one male drawing and one female drawing depicted single-character). While the majority (83%) of the 7-8 year old boys and girls represented characters as being the same size 71% of the children in the younger group drew the teaser character as larger.

Facial Affect-Teaser and Recipient

Girls and boys, regardless of age, were uniform in their depiction of the teaser as a happy individual. All of the children indicated teasers as being happy by portraying the character with a smiling face. The recipient of teasing was depicted as sad (i.e., tears or down-turned mouth) in 83% of the older children's drawings. Younger children's representations of the recipient's facial affect was much more varied with 38% depicting negative affect, 12% a positive affect, 38% a neutral affect, and 12% where no facial affect was depicted.

Context of Drawings

All of the girls' drawings illustrated specific cues as to where the teasing scenario took place (i.e. some depiction of grass, trees, sun, clouds, flowers, school building, tables, chairs, and lights were included in each of the nine

drawings). Eight of the girls' drawing scenarios took place outdoors (with six girls labelling the outdoor area as their school recess area, one girl labelling the outdoor area as a park, and one girl not specifying). The sole female drawing of an indoor teasing scenario was contextualized with the depiction of a table and chairs, a teacher's desk, lights, a book, and overhead lighting. Surprisingly, one of the youngest males provided the only contextual cues of the boys' drawings including a sky, sun, grass, and schoolhouse. Similar to the majority of the girls, this drawing depicted teasing outdoors and specifically in the school playground.

Forms of Teasing

Physical forms of teasing were depicted in both of the older boys' drawings. Similarly, among the younger group of children 86% represented teasing that was physical in nature (Figure 1). In keeping with Warm's (1997) categories of teasing the younger group of children depicted a form of teasing that involved the physical taunting of another. And while the younger girls drawings all depicted the taunting of another by limiting their access or use of a toy or object, the younger males depicted more aggressive forms of taunting (i.e. two depicted spitting, one illustrated hitting, and one depicted taunting with an object). Similarly, the two oldest males also depicted aggressive forms of teasing.

Figure 1. Male Depiction of Physical Taunting

Conversely, as Figure 2 highlights, three of the four older girls depicted aspects of character teasing, that is teasing that relates to a specific aspect of an individual's character, psychological trait, physical trait, or mental characteristic (Warm, 1997). Regardless of the form of teasing depicted, the

majority of the children self-represented themselves as the recipient of teasing in their drawings. Thirteen of the 15 drawings depicted a teasing dyad, where the illustrator identified themselves as the recipient.

Figure 2. Female Depiction of Character Teasing

Indicators of Teasing

As mentioned previously, indicators of teasing refer to the off-record markers that provide the contextual cues to help define teasing behaviour as it unfolds. With the exception of the four drawings depicting speech bubbles, the off-record markers were difficult to discern from the drawings alone. However, from the narratives that occurred during the drawing activity the children indicated laughter, sing-song chants, spitting, smirking, removal of toys and objects from a person's reach, and repeated disruption of another's play as indicators of teasing. Often the children highlighted these indicators by dramatizing the actions or varying their tone of voice as they narrated the story that accompanied the drawing. For example, as the illustrator of the above Figure narrated, "My cousin Samantha she is in Grade five and she teases me all the time and calls me Matty Fatty, Matty Fatty, Matty Fatty", she emphasized the repetition by using sing-song chanting and exaggerated facial expressions.

Additionally, of the four drawings that included speech bubbles, two identified laughter (i.e. "ha ha ha ha") and two included specific text related to another's character as indicators of teasing (Figure 3). However, all four children in explanation of their speech bubble pictures verbalized these indicators with an accompanying sing-song intonation. As illustrated in Figure 3, not only did the verbal statements (i.e. "Ha Ha I'm cooler than

you") cue the recipient to the tease but the delivery of the statement with a sing-song intonation provided even greater contextual information for the recipient. Exaggerated intonation and prosody has been noted as a common feature of adult teasing encounters in previous sociolinguistic studies (Straehle, 1993). Thus, in this study the sing-song chant and the delivery of the off-record marker appeared to be equally important as the indicator itself.

Figure 3. Indicators of Teasing

Narrated Stories of Teasing

Similar to previous research, most drawing sessions contained instances of social talk. Social talk refers to "talk which does not directly relate to the drawing activity or its subject matter but instead focuses on common issues of companionship" (Coates & Coates, 2006, p. 229). During the drawing sessions, children conversed freely with each other and the researcher about topics such as families, home, friends, sports, television, school life and other off-task topics. This social talk was significant in both establishing rapport with the children and often serving as jumping off points to further conversation. As David (1999) highlights knowledge of children's interests and previous experiences help the adult researcher understand where their "amazing ideas, sometime misinterpretations, come from" (p. 3), thus as researchers we remained cognizant throughout the process of *listening* to children. As the children drew, the primary researcher asked questions such as *what is happening in your picture*, *what story is your picture telling*, *why is the teasing happening*, or *what should he/she (recipient) do*? Children

were able to converse freely as they drew or alternately remain quietly concentrated on the drawing task.

Children's Stories

In general, the girls tended to spend more time drawing and utilized greater detail in their drawings. As well, the majority narrated that they themselves were the character being teased. Yet, despite some commonalities in the drawings between the older and younger girls drawings (e.g. visible facial features, including details that depicted the context) the stories that emerged were distinctively different. The younger group of girls tended to narrate stories regarding taunting incidences while the older girls recounted stories about name-calling or social status issues.

Researcher	*So tell me about you're drawing.*
Katrina (5-6 age group)	*I'm drawing something. Somebody teasing somebody else.*
Researcher	*You're drawing somebody teasing someone else.*
Katrina	*Mmhm (nods yes). This is Denise teasing me [points to the characters she has drawn]. Hair band. I did a black head [drew a black head for the character labelled as the teaser].*

The younger girls were also more eager to add to the narrative of each other's stories.

Claire (5-6 age group)	*[Pointing to aspects of Katrina's picture.] That's Denise because she's taking your hair band. (Drawing Narrative School 1-Group A)*

The older girls' narrated stories tended to illuminate themes related to social status, personality or individual ability. As Mary (below) indicated the withdrawal of friendship was a meaningful subject for teasing.

Mary (7-8 age group)	*She was mean.*
Researcher	*And what happened next in your picture?*
Mary	*She said she's not going to be my friend anymore. (Drawing Narrative School 2- Group B)*

All the girls, regardless of age, highlighted the emotional intensity of teasing by describing feelings of *hurt*, *sadness*, *awfulness,* or *upset.* Aligned with previous research (Warm, 1997), these young children tended to describe a heightened emotional awareness in comparison to adult perceptions. Perhaps, as adults we underestimate the emotional intensity of young children's teasing as a result of a lack of awareness of the frequency of that teasing (Lightner et al., 2000).

Similarly, the boys also used emotional state terms such as *sad*, *hurt,* and *bad* to describe the emotional response of the recipient. However, they were equally likely to use terms such as *angry, mad,* and *annoyed* in their narrations.

In general, the boys spent less time drawing and included fewer details in their illustrations. In contrast to the girls' narrations, the accompanying stories of the boys' drawings were uniform and involved elements of aggression either in the tease itself or the response strategy (Figure 4).

Garth (7-8 age group)	*A bully is pushing someone down…[later Garth continues]* *Well he's going to get up and he's going to hurt me again and again and again and again.*
Jack (7-8 age group)	*That guy is kicking him in the face.*

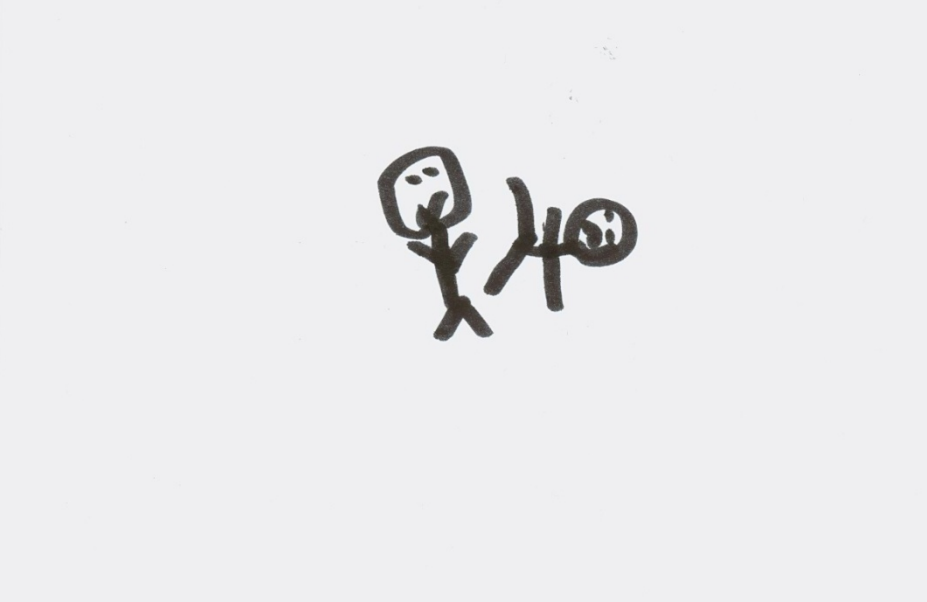

Figure 4. Older Male Drawing of Teasing and Elements of Aggression

Both of the older boys told stories of repeated and intense aggression. Interestingly, the scale of the characters in the two older boys' drawings was distinct from the other children's drawings, perhaps highlighting a need for future research to examine associations between scale of drawings and frequency of victimization. Regardless of the age, physical forms of teasing and elements of bullying were narrated and drawn by each boy (Figure 5).

Researcher	*And what do you think this person should do next? [Pointing to drawn character]*
Samuel (5-6 age group)	*He need to throw him down and get his necklace back.*

Why Teasing Happens?

Overall, the 15 children participating in the drawing activity were unclear as to why teasing happens and why specifically they were the recipients (of the 13 who identified as the targets). When asked questions related to what the teaser was thinking or feeling, the older children unanimously responded with psychological aspects such as "the teaser wanted to make her cry" or "she likes hurting me", or "he's mean". Conversely, all the younger children responded with behavioural or instrumental responses, such as "she wanted her hair band" or "he took her ball away". Gender related differences in responses within the two age groups were not found.

Figure 5. Younger Male Drawing of Teasing and Elements of Aggression

In general, the children labelled the teasers in their drawings as being 'mean' and as individuals who enjoyed teasing (e.g. "he likes to do it"). The eldest group of children were more likely to narrate stories of multiple teasing scenarios while drawing, citing themselves as the frequent recipients.

Response strategies

The drawing task provided children an opportunity to represent their thinking regarding appropriate response strategies to teasing. In most instances the question was personalized, "what did you do?" as 13 of the children drew themselves as the recipient of teasing. It is important to note that only one child depicted a series of events in her drawing with separate panels for the beginning of a tease, the response, and the conclusion (Figure 6). The remaining children narrated the events of the drawing in response to the researcher's question, "tell me what is happening in your picture" or "tell me the story that is happening in your picture". The older children identified "walking away" (two eldest boys) and "getting adult help" (four eldest girls) as the appropriate responses depicted in their pictures.

The younger children expressed more varied response strategies with two boys describing a verbal response (i.e., saying "no" or "go away" to the teaser), one girl and one boy each describing the use of aggression or hostility in response (i.e., hitting or kicking), one girl relating an emotional response (i.e., crying), and three girls who recounted enlisting the help of an adult (i.e., telling a teacher or recess guard or one's mother). Despite the prevalence of typical adult advice to 'just ignore' teasing cited in previous studies (Lightner et al., 2000), none of the children in this study specifically identified 'ignore it' as a response strategy within the context of their real world experiences with teasing. Perhaps, the 'ignore it' strategy does not validate the intensity of the emotional experience for the child and children perceive this strategy as ineffectual.

Moreover, although the 5-6 year old children identified four distinct strategies (i.e., verbal, aggression/hostile, emotional, and adult intervention) the older group's identification of response strategies was limited. Other response strategies identified in previous studies with older children (Lightner et al., 2000; Scrambler et al., 1998), such as the use of humour or empathy, were not evident in the children's drawings or narrations. However, the efficacy of various response strategies has yet to be systematically researched. As well, children's abilities to infer the ambiguous content of a tease and the underlying intent (whether antisocial or prosocial) may impact their use and perceived efficacy of a specific response strategy (Barnett et al., 2004). For example, "some children may tend to display a social information processing bias whereby teases directed at them that are meant to be prosocial and friendly are instead perceived and responded to as if they were meant to be antisocial and hostile" (Barnett et. al., 307). Regardless of individual social and cognitive ability, perhaps all children could benefit from explicit instruction on the variety of response strategies within a real world context such as teasing on the school play ground.

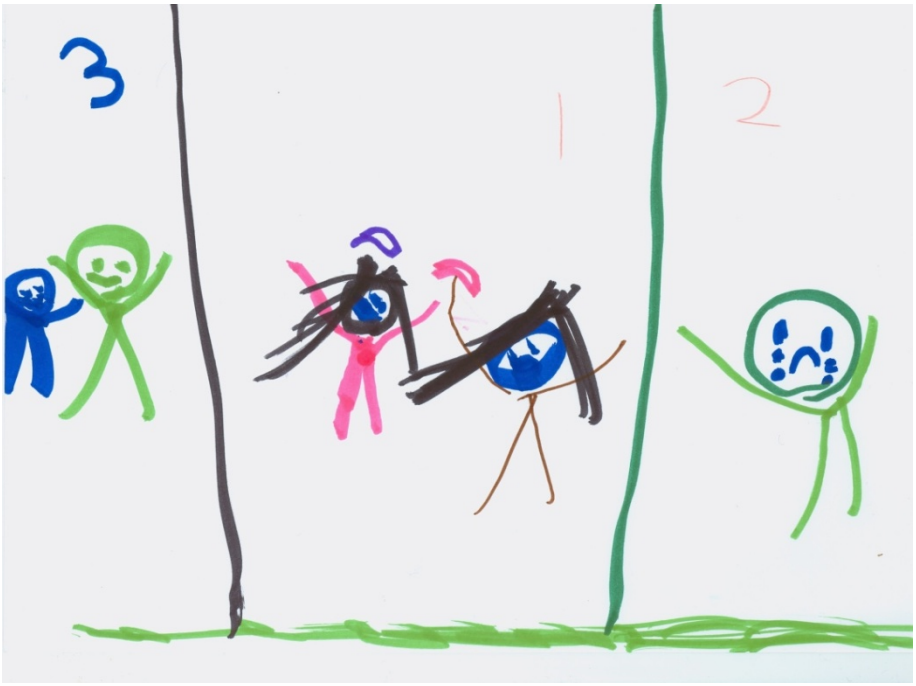

Figure 6. Seriation of Teasing Event

Discussion

An important aspect of this research process was the use of a methodological approach to enable the research team to listen to children. Children were provided with multiple mediums to express their ideas with the goal of the inductive analysis to "create meaning from a mix of representation that are not exclusively text, not exclusively image but rather a polysemic techno-podge of the two" (Sanders-Bustle, 2003, p. 10). The children's drawings revealed complex understandings about the complexity and multi-faceted aspects of peer teasing which may ultimately help researchers to broaden current conceptualizations of teasing. For example, teasing patterns found in this study were distinct from patterns previously reported in other teasing studies (Keltner et al., 2001; Mooney et al., 1991) and studies on bullying (Bentley & Li, 1995; Craig & Pepler, 1997; Whitney & Smith, 1993). In this study, same-sex teasing was identified most often with relatively high numbers of drawings depicting girls as the instigator of a tease. Moreover, the increased social complexity of teasing scenarios (i.e., teasing that involved more than a dyad) was only depicted by the youngest group of children while the older group of children portrayed teasing dyads. Furthermore, a power-differential was only depicted in the younger children's drawings with the older children drawing the teaser and recipient as being the same size.

Often within current research practice teasing is conflated with bullying (Froschl & Sprung, 2005; Olweus, 1993; Ross, 1996) and various negative outcomes have been found to be associated with antisocial forms of teasing (Furman & Thompson, 2002; Olweus, 1993). In contrast, studies on prosocial teasing are less evident (Barnett, et al., 2004). And as Keltner et. al.'s, (2001) review of the teasing literature indicated most of the previous research has not specifically focused on children's perceptions and experiences with different forms of teasing.

In this study, children's perceptions provided cues on further defining teasing and differentiating teasing from other forms of social behaviours. Several indicators were included in the children's drawings and narrations that highlight the potential uniqueness of teasing as a social phenomenon. For example, physical forms of teasing tended to dominant the boys and 5-6 year old girls' drawings while older girls depicted aspects of character teasing (i.e., teasing regarding a specific aspect of an individual's character, physical, or mentalistic trait) (Warm, 1997). Thus, teasing cannot be examined solely as a verbal or communication act (Eisenberg, 1986) and the definition must be broadened to include physical forms of teasing that appear more typical of younger children.

Additionally, the use of off-record indicators appears to be utilized by children in defining and differentiating teasing. And although only four children depicted speech bubbles, the remaining children described a series of indicators to indicate the intent to tease (e.g., laughter, sing-song chants, spitting, smirking, removal of toys and objects from a person's reach, and repeated disruption of another child's play). And although little is known about the indicators of teasing, the findings of the present study are generally consistent with the results of a previous study on young children's teasing behaviours (Harwood, 2008).

The contextual cues provided in the girls' drawings tend to highlight the propensity for teasing to occur outdoors (and often in the school play yard), an area of often minimal supervision. This finding tends to be in line with previous findings that adults are generally unaware of the frequency of teasing (and bullying) among young children (Harwood, 2008; Mooney & Smith, 1995). The response strategies that were portrayed in the children's drawings and narratives of this study further highlight the potential uniqueness of teasing as a social phenomenon. Although it was the younger group of children that were more likely to depict greater variety of responses, it is important to note that the awareness and perception of teasing response strategies appears rooted in early childhood. Potentially, explicit instruction on various response strategies in relation to the diverse forms of teasing would have greater impact in early rather than later elementary.

However, like the findings of previous research on bullying (Bosacki, Zopito, & Dane, 2006), the majority of the instigators of teasing were also

depicted as happy in this current study. Perhaps, children's perceptions of teasers appear closely aligned with the concept of a 'happy bully' or 'happy victimizer' identified in previous research (Malti, Gasser, & Buchmann, 2009; Malti & Keller, 2009). Nonetheless, as the majority of the children self-represented themselves as the recipients of teasing this finding may not be consistent across more varied groups of children (i.e. instigators and recipients, frequent teasers, infrequent teasers, etc.). Noticeably absent from the drawings and accompanying narratives was any consistent indication of why teasing happens and specifically how and why specific recipients are chosen as targets. And although older children cited psychological aspects to explain what a teaser was feeling or thinking, younger children responded with behavioural or instrumental justifications. Clearly, more research is needed in this area before specific curricular programs can be recommended and the argument of targeted skill deficit curricular approaches versus school-wide modules that focus on social-emotional development remains largely unanswered. Longitudinal studies on the development of teasing and the investigation of the role of age, gender, and language are greatly needed as a dearth of literature specific to teasing currently exists.

The results of this study should be interpreted with caution. The participants represented a relatively small sample of homogenous children who were nominated to participate in the study by their parents. Whether or not these children were frequent teasers or recipients was unknown, and thus the results may be skewed and over-represent or under-represent the perceptions and experiences of one particular form of teasing behaviour. However, the study highlights potential avenues for future research. Namely, the perceptions of children from diverse background would greatly enhance our understanding of teasing in a variety of contexts. Additionally, the efficacy of various response strategies, the correlational or causal relationship between various developmental aspects and teasing, and the implications of gender and social status on teasing are other potential avenues to explore.

This research followed an ethic of *listening to children*; principles equally important for researchers and teachers of young children. The children of this study were provided with a variety of means to express their thoughts and experiences on a personally meaningful topic. The children were clearly appreciative for the seriousness of the attention and focus provided to them, at times verbalizing to their non-participating peers, "she's here to talk to me", or "she wants to know what I think" (children's narratives). The children's responses and drawings confirmed the feasibility and utility of using visual and narrative methodologies as a means of gaining that insider's perspective.

The results of this study indicate that peer teasing is a topic of concern for young children and they have unique perspectives and insights into this social phenomenon. Clearly, young children are capable of

contributing to the scarcity of teasing literature that currently exists when provided mediums that support their *voice*. Perhaps, by including children's perceptions and insights, curricular approaches can be contextualized and explicitly address the needs of individual groups of children. By actively *listening to children* the practical, conceptual, and theoretical understandings of the teasing phenomenon can be expanded and new avenues pursued.

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Dr. Debra Harwood is an assistant professor in the Faculty of Education of Brock University, Canada. She specializes in aspects of curriculum and instruction within the field of Early Childhood Education.

Dr. Sandra Bosacki is an associate professor in the Faculty of Education of Brock University, Canada. She specializes in emotional and sociocognitive development and educational implications.

Kristina Borcsok is a graduate student research assistant, Brock University.

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Professional development for the early learning content social studies standards

Laurie KATZ
The Ohio State University, United States of America

Hatice Zeynep INAN*
The Dumlupinar University, Turkey

Cynthia TYSON
The Ohio State University, United States of America

Adrienne DIXSON
The Ohio State University, United States of America

Hyun-Young KANG
The Ohio State University, United States of America

Abstract

This article describes early childhood educators' responses to a professional development series aimed at helping them to understand and incorporate early learning standards for social studies. While the primary aim of the professional development was to focus on the social studies content standards, the secondary aim was to introduce early childhood educators to culturally relevant pedagogical strategies that take into account the unique learning needs of diverse children, particularly children of colour, English language learners and children with special needs. The findings suggest that early childhood educators can benefit from sustained professional development that not only addresses content standards but also helps them to understand how to incorporate the standards into their existing curriculum using developmentally and culturally appropriate pedagogy.

Keywords: Early Childhood; Social Studies; Standards; Professional Development

Introduction

Standards of learning for children before they attend kindergarten (ages 2 to 5 years old), typically described as *early learning standards,* started developing in the 21st century (NAEYC & NAECS/SDE, 2002). The need to design standards separate from children in the early elementary years is

* E-mail for correspondence: haticezeynep@hotmail.com

based on "research about the processes, sequences, and long-term consequences of early learning and development" (p.5). Given that young children have unique features of learning, it is important that content standards reflect this uniqueness. Simply modifying the standards for older children is insufficient. The National Association for the Education of Young Children [NAEYC] has called for teachers to design and implement developmentally appropriate practices that promote young children's cognitive, sensory-motor, communicative and social-emotional development in a manner that is responsive to the cultural and social contexts in which children live. These developmentally appropriate practices focus on 'what and how young children need to be educated' and are based on the children's developmental status. Thus, it is important for early childhood educators to know and understand the relationships between early experience and young children's development to support their learning appropriately (Copple & Bredekamp, 2009). These practices emphasize the importance of offering children engaging classroom curriculum experiences such as hands-on learning, inquiry-based activity, in-depth exploration, and cooperative learning, all of which support children's active learning as well as the child's development within the social context. The beginnings of the early learning standards primarily focused on literacy and math. The National Council of Social Studies has called for teacher educators to take responsibility for designing effective early childhood social studies for preservice and inservice early childhood educators (NCSS, 1994).

A review of the 50 official State Department of Education websites (http://edstandards.org/StSu/Social.html) found 18 states that have developed pre-K social studies standards (see Appendix A). Many other states are in the process of developing these subject standards for their preschoolers. In 2004 Ohio developed Early Learning Content Standards in social studies (ODE, 2004). Ohio's early learning content indicators align to the K-12 indicators, benchmarks and standards. They are the result of quality early learning experiences in all types of settings (e.g. preschool, family childcare, nursery school, etc.). The purpose of this paper is to demonstrate the State of Ohio as an exemplar in preparing early childhood educators to address the Early Learning Social Studies Standards.

The Professional Development and Early Learning Standards

The professional development for the Early Learning Content Standards [ELCS] in Social Studies was sponsored by the Ohio Department of Education, Office for Exceptional Children in cooperation with the Office of Early Learning and School Readiness and presented by The Early Childhood Quality Network through The Ohio State University. The design team consisted of several social studies and early childhood education faculty from three universities in Ohio, consultants from the Ohio Department of Education, and the Q-net staff. The design team designed one module that was presented in three four hour sessions totalling 12 hours.

The modules provided a deeper understanding of the social studies standards through pertinent principles that addressed effective pedagogy for young children (3-5 years of age). Participants learned the definitions and related meanings of the seven social studies standards (one process and six content standards), as well as the associated benchmarks and indicators pertinent to early childhood education settings. The following principles were integrated throughout the modules: Developmentally Appropriate Practices [DAP], Integrated Curriculum, Universal Design for Learning [UDL] (Rose & Meyer, 2002), Multicultural Education (Banks, 1994; 1997), Multicultural Literature (Bishop, 1997; 1999; Harris, 1992).The team designed the modules to not only teach new concepts related to multicultural education, working with exceptional children and social studies content standards, but also to help early childhood educators understand that many of their learning activities were already meeting some of the social studies standards.

Over 400 early childhood educators throughout Ohio participated in some aspect of the professional development program. The participants included preschool general educators and their directors, early childhood special educators, teacher educators in 2 and 4 yr. institutions, family child care providers and other personnel responsible for curriculum in their educational settings. The participants received various levels of state-required certificates, continuing education units and credits. This was especially important for those participants who needed to maintain or upgrade their certification (and even employment) in early childhood settings.

Each module focused on several content standards as a means to illustrate how teachers could attend to issues of culture and diversity, as well as design curricula and lessons that were accessible to all students. The modules incorporated vocabulary related to pedagogical strategies such as culture, intentional teaching and universal design. In addition, in each module, participants had the opportunity to back map the newly introduced concepts; teachers examined how classroom activities and routines already matched some standards indicators. Participants worked primarily in small groups, although facilitators also used whole group discussion to reinforce the concepts and the standards.

We conducted a study to explore how early childhood educators integrated aspects of the ELCS-Social Studies standards, which were presented through a professional development program, into their early childhood settings. In addition, we also explored barriers that prevented participants from implementing aspects of the ELCS-Social Studies into their settings. It is essential to state here that the aim of this interpretivist research is not to evaluate modules or the professional development program, but to interpret the status of early childhood educators' understanding and implementation of the Early Learning Social Studies

Standards in Ohio. More specifically, the following questions guided the research project:

1. What were the participants' knowledge and implementation of the social studies standards related to the following content standards; a) People and Societies, b) Citizens Rights and Responsibilities, c) Government, d) Geography, e) History, f) Economics and g) the process standard- Social Studies Skills and Methods?
2. How did the participants implement developmentally appropriate activities related to the social studies standards?
3. How did the participants use Universal Design Principles within their implementation of the social studies standards?
4. How did the participants integrate multicultural literature into their implementation of the social studies standards?

Method

Participants

Data collection consisted of three parts: a written survey, telephone interview and site visit (see Appendix B, C & D for Survey, Interview & Observation Protocols). Participants agreed to the evaluation project by signing a consent form that was attached to the survey. Although most participants attended the modules, there was a portion that only attended one or two sessions. Thus, our sample only included participants who attended all three sessions. In this study, confidentiality of the participants was accomplished by concealing the real names using pseudonyms, and no information that could be used to identify the participants was included.

Data Collection and Analysis

As consistent with Spradley's method of data collection and analysis, the current research aimed to reach an in-depth interpretation on the topic of interest. Accordingly, we looked for volunteer participants who could spend the time and effort needed to provide deep information. Surveys were mailed with self-addressed stamped envelopes, to 281 people who attended all three sessions. Every participant freely chose to volunteer, and they had two weeks to return the surveys. To conduct the current interpretivist research, a few rich cases were enough to provide deep information (Robert Wood Johnson Foundation, 2009). Of the 281 surveys mailed, 24 surveys were completed by the participants to some extent. From the 24 surveys returned, 7 respondents did not complete any part of the survey questions. Participants cited the following reasons for not completing the survey:

1. They were no longer at their early childhood settings;
2. Their programs hadn't been in session from the time they completed the modules to the present;

3. They were not teaching in an early childhood setting and had taken the modules for other reasons.

Since 17 participants were sufficient for an interpretivist research to reach in-depth information, we did not conduct another attempt to reach the participants who did not complete the surveys. All participants who returned the survey were provided with one of the books used in the modules, *We can work it out: Conflict resolution for children* by Barbara K. Polland. In the survey, we asked participants to volunteer for follow-up phone interviews by one of the researchers. The follow-up phone interviews helped us to clarify information on the surveys and to give participants the opportunity to elaborate on their responses. Phone calls were recorded and transcribed. Finally, we did site visits of those participants who participated in the phone interviews. Nine respondents agreed to phone interviews, but due to delays and difficulties in obtaining these phone interviews, only 3 phone interviews were conducted. As a result, we conducted two site visits. One site visit was in the home of a family child care provider and the other was of a preschool teacher in a child care centre program. During the site visits, the teachers were briefly interviewed by two members of the research team who also observed the classroom setting and current activities. Field notes, photographs and artefacts from the setting were collected during this time.

To conduct more focused research, to obtain rich data, and to analyze data, Spradley's Developmental Research Sequence [D.R.S.] Method (Spradley, 1980), an ethnographic method, was utilized in this study. Data collection was conducted in multiple contexts within three main phases. The phases were basically as follows:

Phase 1. Survey with attendees to the modules
Phase 2. Phone interviews with some of those who participated in the survey
Phase 3. Site visits to the selected participants of phone interviews

Spradley's taxonomic analysis was primarily used to develop categories and patterns from the data in addition to triangulating the different types of data to better address the research questions (Spradley, 1980). Researchers conducted a Domain Analysis, which looks for semantic relationships between cover terms (both folk and analytic terms) and included terms under those cover terms, related to a single kind of activity (i.e., social studies) in a social situation (i.e., preschool classrooms of teachers who attended all three sessions). In later steps of the analysis, researchers considered Taxonomic Analysis, "which involves a search for the way cultural domains are organized" (Spradley, 1980, p. 87). Spradley's Semantic Relations analysis through cultural domain analyses gave in-depth interpretive information about some of the social studies activities

and resources embedded in the culture of the preschools that participated in the study.

Findings

Of the 17 participants whose responses we analyzed, two were from family child care centres; six worked in settings predominately with children having special needs; and nine worked in settings with preschoolers who were "typically-developing." Appendix E provides specific information on each of the 17 participants in terms of their types of centres, children served (typical developing or special needs) and data sources. Findings from the research questions are presented in this section with examples and quotes from participants' data sources. This information is identified by a number (1-17) and pseudonym of the participant that is referenced in Appendix E. Since we were able to collect three sources of data from two of the participants, (Mary #5 and Rebecca # 6) we provided more detailed information about them. The site visits to their early childhood programs helped us ascertain the extent to which the participants implemented the standards in their particular setting.

Mary was a preschool lead teacher of European-American descent at the Child Development Centre. She had a Bachelors of Science degree in a discipline unrelated to children that she received about 25 years ago. She was working at the centre for about 6 years. She held both a Child Development Associate and an administrator certificate, and continued to participate in educational preschool content modules besides the social studies module. The Child Development Centre was part of a national demonstration model that addressed issues of substance abuse and mental health in conjunction with early education and intervention. The Centre was located in a major urban city near a university and medical centre. There was an infant-toddler room and a preschool classroom. The centre served children of families who received services within the centre as well as families from the local community. These children were primarily from single parent households and of African-American descent. There were a few children from other nationalities including those who were English language learners. Most of the children were considered typically developing except for one child who received speech therapy.

Rebecca had been a family child care provider for about 19 years. She had an associate degree that she completed from a local university. At the time of the research, she was starting her bachelor's degree via an online program with an emphasis in children from birth – 5 years of age. In addition to completing ELCS in social studies, she had completed the ELCS in English language arts, science, and math. She also enrolled in the Pre-K State Institutes for Reading Instruction [SIRI]. Rebecca was African American descent and cared for 6 children ages of 3 – 5 years old who were of European American descent and from low and middle income families. All of her children were considered "typically-developing" and some of her

children received remedial reading services in their schools. In the past, she visited their schools to coordinate services so she could support their literacy development within her program.

During the site visit, we observed her kitchen and living room area converted into multiple centre areas including science, literacy, and art as well as a puppet stage. She was aware that family childcare providers was stigmatized as "baby sitters" and worked diligently to counter this perspective by providing an educational program. When she started ELCS-social studies, her primary concern originally was its relevancy to family child care providers. She evaluated the modules with the following quote, "I've learned from the great facilitators that we've had, it's not going to look any different from a school setting – it's the way you present it to the children and what you present."

Findings for the first research question (What were the participants' knowledge and implementation of the Social Studies standards?) is reported as activities the teachers implemented within each of the social studies content standards. The activities are also aligned with the respective early learning indicators and benchmarks that children should know and be able to perform by the end of second grade. Although the participants didn't always specifically state the social studies standard indicator, the data supported the participants' demonstrated knowledge of them. For example, during both of the site visits these standards were visible. Rebecca, as a family child care provider, documented how she addressed the standards in the form of a portfolio with pictures of activities she conducted with the children next to the related social studies standard and indicator. In Mary's early childhood centre there was a big chart of ELCS located on a wall of the entrance to the centre.

Social Studies Standard: People and Societies

Benchmark: Identify practices and products of diverse cultures.
Indicators: 1: Develop a sense of belonging to different groups
2: Demonstrate awareness of different cultures through exploration of family customs and traditions

Respondents focused on teaching children about themselves in the context of their families as well as the cultures of others. These activities included making "all about me" books, dolls representing each child in the class, and sharing family pictures. Some of these activities helped children appreciate their own and others' unique physical features such as height, hair texture/style, eyes and skin colour, as well as learning about the uniqueness of other children's families. Cindy (#2) writes about her doll-making project:

> "We started our new school year out with a month-long study of heritage family background. All the children made "paper dolls" of themself[ves], painted them the "right" skin colour, dressed them and then hung them all up and down the hall. We then invited grandparents to come in and help their grandchild make a family tree

> to hang up their paper doll. We then took pictures of the grandparent/child together and hung them on the trees. A special time for kids and grandparents."

Susan (#3) shares her quilt activities, which she relates to the People and Societies standard:

> The introductory lesson to this quilt wall hanging was an examination of several quilts and discussion of how people made quilts and why they made them. We discussed famous quiltmaker[s] such as Amish and Appalachian cultures. We discussed family memories because of quilt pieces being cast-off scraps. I feel we hit the 'people and society' standard in many areas with this project.

Respondents taught about cultures primarily by focusing on holidays and foods from respective countries. Susan (#3) also shares:

> "During the past year, we have observed holidays of various cultures. We've celebrated Cincodemayo, Chinese New Year, Tet,(illegible), Boxing Day, Mardigras, Children's Day, being careful to use authentic cultural foods, games & themes".

Social Studies Standard: Geography

Benchmark: Identify the location of the state of Ohio, the United States, the continents and oceans on maps, globes, and other geographic representations.

Indicators: 1: Demonstrate and use terms related to location, direction and distance
2: Demonstrate the ways that streets and buildings can be identified by symbols, such as letters, numbers or logos (e.g., street signs, addresses)
3: Demonstrate how maps can be useful to finding places

A few of the respondents appeared to use concepts such as location, direction & distance not in separate activities but in the context of "when working on things in the classroom."

Many respondents focused on Indicator 2; demonstrating the ways that streets and buildings can be identified by symbols through fieldtrips; e.g. using maps to direct them, drawing maps and reading directional signs. For example, Wendy (#12) states,

> "We talk about where we are walking on our field trips on foot. What street and where do we turn? Stopping at STOP signs and traffic lights. Noticing landmarks such as the library, the church, the fire station, the doctor office."

The majority of the responses focused on their use of maps (Indicator 3). These activities involved a) maps posted in different parts of the classroom where children helped locate (and draw) pictures of their homes on designated locations of the maps, and b) children drawing their own maps of their classroom, bedroom, school and playground. In addition, teachers used maps to help children understand their community in terms of important locations within their lives; e.g. their home, school, parents' place of employment, local library, stores, restaurants and parks. Judy (#4) writes:

> "we use a large wall map of our town and county and find how close or far away from school we live. Each child decorates their own house to place on the map. We create a class map, school and playground map."

Benchmark: Identify physical and human features of places.
Indicators: 4: Navigate within familiar environments, such as home, neighborhood or school, under supervision.
5: Describe and represent the inside and outside of familiar environments such as home and school.
6: Recognize and name the immediate surroundings of home (e.g., homes, buildings, bridges, hills, woods, lakes) following supervised explorations.

Respondents primarily addressed indicators 4 and 5 by taking walks with their children within the building as well as near the vicinity of their building. One classroom was located next to both a park and street. In this context the teacher helped children differentiate between city streets and nature trails. Some children "made" maps with landmarks of these areas to "show how to get to each place."

Benchmark: Explain how environmental processes influence human activity and ways humans depend on and adapt to the environment.

Indicators: 7: Explore the ways we use natural resources found in our environment (e.g., water to drink, dirt to plant).

Only a few of the respondents focused on this indicator by describing some of their planting activities, such as growing pumpkins, as part of a garden project. Kathy (#17) describes her use of the garden to address a geography indicator:

> "Currently using the garden to discuss and document changes (pumpkins) as they grow, change and how this occurs."

Social Studies Standard: History

Benchmark: Use a calendar to determine the day, week, month and year.
Indicators: 1: Begin to use the language of time
2: Label days by function

The majority of these responses occurred during morning circle time when teachers instruct on specific aspects of the calendar. During this time, children learn how to identify the day(s) of the week use language to denote these days; e.g., yesterday, today and tomorrow. They label days by function by identifying routines and other activities throughout the day, as well as special activities that will occur on specific days; e.g. fieldtrips, children's birthdays. Past events are also discussed, such as national holidays, an ice storm that occurred last year, and the tragic event of September 11, 2001. For example, Mindy (#11) stated,

> "We work on a calendar to allow the children to draw what is going on that day at school, when was yesterday, tomorrow, when are stay-at-home days, etc. We also do

> recall with story time and after free-play to remember what happened during the day."

It's important to note that one participant, Susan(#3) in her survey seemed to respond inappropriately to the use of this standard:

> "During President's Day observances, our lessons revolved around 'whose turn was it to be president?' We talk frequently about history using 'whose turn' questions; e.g. It was Mr. Armstrong's turn to walk on the moon first."

It's unclear how this participant connected the use of turn-taking with an historical event.

Benchmark: Compare daily life in the past and present demonstrating an understanding that while basic human needs remain the same, they are met in different ways in different times and places.

Indicators: 1: Share episodes of personal history from birth to present, through personal memorabilia or connected to stories.
2: Arrange sequences of personal and shared events through pictures, growth charts, and other media.

Many respondents focused on sharing episodes of personal family in different ways, such as bringing in pictures of their families and creating a family bulletin. Indicator 2 was addressed by making "all about me" of "family photo books, and putting together a child's time line through pictures of themselves as babies, 2 years-old and current pictures." For example, Dee (#1) stated, "We make family photo books & share special family events at circle time."

Benchmark: Recognize that the actions of individuals make a difference and relate the stories of people from diverse backgrounds who have contributed to the heritage of the United States.
Indicators: 1: Share personal family stories and traditions.

Many respondents shared personal family stories and traditions through various ways, such as family game night and family events. These events encourage and provide opportunities for family history/culture to be seen and discussed. Respondents also stated that parents come in and share what they do for holidays, and children share family pictures with the class. For example, Beth (#10) stated:

> "We start each day with what the day is today, what was yesterday and what tomorrow will be. We point out special days coming up and count them down. We also share family pictures of our grandparents, parents, siblings, etc. with the class."

Social Studies Standard: Economics

Benchmark: Explain how the scarcity of resources requires people to make choices to satisfy their wants.

Indicators: 1: Recognize that people have many wants within the context of family and classroom.

2: Understand how sharing classroom materials will meet everyone's wants (e.g., turn taking at the water table and distributing crayons equitably.

Respondents focused on the Scarcity and Resources Benchmark by teaching concepts of sharing and problem solving. Opportunities arose throughout the daily routines for children to share items or take turns with classroom materials, toys, snacks and riding bikes. Also, respondents designed contexts to teach this concept if they didn't occur within the daily routines. For example, Beth (#10) describes how she addressed this standard:

> "(In) small group- have a large ball of blue play dough & a large ball of yellow play dough. Allow students to discuss & problem solve how to *divide* play dough so all friends have 2 pieces for play."

Moreover, parents baked bake sale items to make money for people with needs, and the children helped them in various ways, such as signs to advertise the bake sale.

Benchmark: Distinguish between goods and services and explain how people can be both buyers and sellers of goods and services.

Indicators: 3: Demonstrate an understanding of the concepts of production, distribution and consumption through play (e.g., food from the farm, to the grocery store) and concrete experiences (e.g., food purchased from the store and cooked at home).
4: Obtain things they want (e.g., goods and services) in socially acceptable ways (e.g., verbalizing, turn taking).

Respondents focused on demonstrating an understanding of the concepts of production, distribution and consumption via play and concrete experiences: setting up a store, playing market games and organizing field trips to restaurant and a farm. During those activities, children requested the items they wanted to purchase in an appropriate manner. Cindy (#2) writes:

> "We have a play store they have to use 'money" to buy things from. We also have to *share* the money and toys to buy. We do a lot of activities helping the kids learn to *verbalize* what they need and how to ask 'nicely' to get what the need."

Social Studies Standard: Citizen Rights and Responsibilities

Benchmark: Describe the results of cooperation in group settings and demonstrate the necessary skills.

Indicator: 1: Demonstrate cooperative behaviours such as helping turn taking, sharing, comforting, and compromising.

2: Engage in problem-solving behaviour with diminishing support from adults

Eight respondents focused on promoting cooperative behaviours in the classroom. Many of these behaviours were addressed during routine classroom activities, while only one respondent implemented a specific program, 'character education,' to teach these behaviours. Kathy's (#17)

quote is representative of how the teachers design their management system to address this indicator:

> "Use of management system helps with sharing, and taking turns. Teachers encourage problem solving when situations warrant during play, conflicts and teacher directed activities (How do you…?) Children are asked a question of the day to facilitate decision making."

Benchmark: Demonstrate personal accountability, including making choices and taking responsibility for personal actions.

Indicator 3: Demonstrate awareness of the outcomes of one's own choices

Responses focused on Indicator 3 by describing a) voting on activities that the children wanted to participate in the classroom; e.g., singing songs or painting and b) classroom rules that were developed by both the teachers and the students. Susan (#3) describes how she was helping the children take responsibility for themselves and others.

> "Our special needs children delight in taking care of one another. We do lots activities using partners or buddies. Our children vote on which books we read, and many activities. Many times I will deliberately suggest an activity to which one of the children will object because not everyone can participate in it. Some of the children are wheelchair users; some are children with multiple physical and mental limitations. The more abled children will reject the activity because 'our friend ----- can't go/or do the activity.' "

Social Studies Standard: Government

Benchmark: Identify elected leaders and authority figures in the home, school and community and explain reasons for having persons in authority.

Indicators: 1: Interact with and respond to guidance and assistance in socially accepted way from familiar adults at school and home (e.g., responds to redirection, invites others to play).
2: Interact with familiar and appropriate adults for assistance, when needed.
3: Demonstrate an understanding of the specific roles and responsibilities within a group.

Many of the activities addressed directed specific roles and responsibilities of children to maintain their classroom (Indicator 3) through the implementation of a job chart. The example below is from a site visit in Mary's preschool classroom. Mary notes that one of the ideas she learned from the professional development program was the expanded use of a job chart. She implemented this idea to establish a better routine with the children, as well as help children assume responsibility for their classroom. The job chart hangs in the classroom and consists of big colour pockets with children's names placed on each pocket. The colours correspond to specific jobs in the classroom. Mary notes,

> "They started to recognize their job and they started to recognize their name. So, every day we have major jobs, like we have to feed the fish, like today is Friday, we're going to be gone for the weekend, the fish feeder job is really important on

> Fridays. The person who cleans up the library books, after lunch we have a time set aside for library time, so I always have to use each job and mention the importance, and so the kids kind of recognize what job they have…. The kids come in and they'll say, 'Can I be snack helper?' 'Can I be computer operator?' You know, it's part of their routine every day to ask what they're doing, can they have that particular job, and then they follow through on it."

Another set of responses from the participants' data focused on understanding the role of people in the community to maintain the government (Indicators 1 & 2). Activities included inviting people into the classroom, such as police officers and fire fighters, to explain their roles in the community to keep them safe. In the school, people were identified to assist in maintaining classroom structure and routine. People available in children's homes and school were also identified to assist them.

Benchmark: Explain the purposes of rules in different settings and the results of adherence to, or violation of, the rules.

Indicators: 1: Participate in creating and following classroom rules and routines.

Benchmark: Recognize and explain the importance of symbols and landmarks of the United States.

Indicators: 1: Recognize the flag of the United States as symbol of our government.

Many of the responses focused on symbols of the United States government such as learning about the country's flag, e.g., representation of the stars and stripes, behaviour that demonstrates respect for the nation's flag (e.g., pledging allegiance to the flag) and the role of the U.S. President.

Activities included: making their own flags, reading about these symbols through books, singing patriotic songs 'God Bless America' and celebrating President's Day. For example, in Valerie's (#7) writes in her survey "Our little school is out in the country. We read a book 'The Pledge of Allegiance.' They looked at the flag in the room. In small groups we walked through school & looked where flags are located. Then we discussed the colours & symbols in our flag. In art, they each created a 'preschool flag' using their own favourite colours & a symbol they liked."

Social Studies Standard: Social studies skills and methods

Benchmark: Obtain information from oral, visual, print and electronic sources.

Indicators: 1. Gain information through participation in experiences with objects, media, books and engaging in conversations with peers.

Benchmark: Predict outcomes based on factual information.

Indicators: 2: Begin to make predictions

Benchmark: Communicate information orally, visually or in writing.

> 3. Represent ideas through multiple forms of language and expression (e.g. drawing, dramatic play, conversation, art media, music, movement, emergent writing).

All respondents reported the use of a variety of social skills and methods connected with their activities. Each documented the use of visual and oral sources. They reported the use of books, graphs, calendars, lists, photographs and other written materials in social studies classroom lessons. One respondent mentioned music and movement. Overall, the respondents reported the use of a variety of social skills and methods, using not only support materials but also problem solving techniques in child, peer, and teacher led instruction.

In summary, all but one of the respondents addressed all of the seven content standards appropriately. They addressed the standards through a wide range of activities that involved relationships with their peers, teachers, families and local communities.

Developmentally appropriate activities

The second question addressed how the participants implemented developmentally appropriate activities related to the social studies standards.

Most respondents provided descriptions of their activities, but not all were able to identify how the activity was developmentally appropriate. Reasons provided for their activities as "developmentally appropriate" included a) how these activities promoted development within the children's domains, b) activities that were predictable and incorporated into the routine of the classroom, and c) voluntary verses compulsory participation. Dee (#1) writes how a social studies activity within the geography standard was developmentally appropriate:

> "We physically walked the area and identified what to include on the map; we shared ideas and drawings (social-emotional); language dictated, wrote and drew locations. We discussed the importance of maps, local, natural world, and their uses (cognitive). Problem solved on how to follow the map."

The following example is a description of the accommodation Aida (#14) makes for a student with a "muscle disease" disability, which she thinks is developmentally appropriate:

> "It was appropriate, I think, because it's predictable and routine. The students will learn through the repetition. With one student who has a muscle disease, I "spot" him as he walks by himself, cruises along furniture from place to place in the classroom, or walks to music… and library. During music and movement in the class on the rug, I sit behind him (on a chair) so he can lean against me when needed to do movement. I work with the P.E. (physical education) teacher to give him alternate activities if necessary."

In this example, she points out that her accommodations are developmentally appropriate because of how she includes him with the other children. Her example is also representative of Universal Design for

Learning [UDL] in terms of her efforts to make the curriculum accessible to a student with a disability. In summary, the respondents implemented developmentally appropriate activities with their children who were typically-developing; as well as with their children having disabilities. Many of these activities involved hands-on experiences where children had opportunities to explore more about themselves, their family backgrounds, and aspects of their communities.

Universal Design for Learning

The third research question addressed the participants' use of Universal Design for Learning (UDL) within their implementation of the social studies standards. There are three principles that were taught as part of UDL in the professional development program. The first principle, multiple means of engagement, ensures the presentation of various opportunities for engaging the children's attention, interest, and personal styles in the activity. The second principle, multiple means of representation, ensures instructions, questions, expectations and learning opportunities are provided in various formats that address a range of ability levels and different learning styles. The third principle, multiple means of expression, is the process of a child expressing an idea such as drawing, speaking, writing, acting out, singing and dancing.

Only one respondent specifically mentioned UDL, but approximately 65% of the respondents provided information that reflected knowledge of some aspect of the UDL principles. It is important to note that in several of these responses, more information was needed to fully understand the context of how the UDL was applied.

Many of the examples provided were part of "multiple means of representation." These examples included use of augmentative communication devices (e.g., switches), sign language, pictures, teacher and peer modelling, teacher redirecting, having a child touch items, verbal prompts by the teacher, and words/songs in different languages. A few examples of the multiple means of engagement principle included the use of a wagon to take children to the library and supporting the child's physical condition so he can participate in an activity. The following example from Susan's (#3) survey describes how a teacher constructs a context where peers incorporated a child with a specific disability within their play.

> ". …a girl in a wheelchair, limited by cerebral palsy. She is nonverbal, had limited fine motor skills. Children willingly give up the chair at the end of the table so she can sit at the end of the table with them. When she indicates she wants a toy, they get it for her and stay beside her to play with her. They place tea party items on her chair tray so she can play tea party, too, even though she will probably knock the cup off the tray if she reaches for it. The playmates just pick the cup up and put it in her hand."

Aspects of UDL were directed towards children considered having "special needs." Nine respondents specifically indicated the type of children with "special needs" in their classrooms as having developmental delays,

behavioural concerns or attention deficit hyperactivity disorders. Other respondents identified specific physical and speech/language disabilities (e.g. nonverbal, cerebral palsy). One person included English learners in their response.

Seven participants (41%) indicated making no changes to any of their social studies activities either because they didn't have children in their classrooms who require any adaptations or that activities were conducted at a level where everyone could participate.

Multicultural literature

The final question addressed how the participants integrate multicultural children's literature within their implementation of the social studies standards.

All respondents reported using multicultural children's literature to support the teaching of social studies in their classrooms. They reported thirteen multicultural titles by name and eight other picture books. There were direct connections to social studies content; one respondent mentions the geography standard (location, direction and distance). Others reported the use of literature that could be directly connected to history, family, culture, and relationships. Rebecca (#6) reported:

> "I used the nursery rhyme of Jack and Jill to talk about friendships and cooperative behaviours. I used *Harold and the Purple Crayon* to have children 'demonstrate and use terms related to location, director, and distance' (Geography standard) on a large sheet of paper."

They also emphasize the importance of the quality of the multi-cultural literature in helping children learn about the many aspects of a culture-its values, beliefs, ways of life, and patterns of thinking. Participants also stated that, in addition, exposure to quality multicultural literature helps children appreciate the other ethnic groups, eliminate cultural ethnocentrism, and develop multiple perspectives. Participants each implemented the social studies standards using culturally diverse materials to reach benchmarks along the way. As they discussed the teaching of social studies, early childhood educators recognized that the use of multicultural literature written for young children can help children understand that beneath the surface differences of colour, culture or ethnicity, all people experience universal feelings of love, sadness, self-worth, justice and kindness (Dowd, 1992).

Discussions and Implications

For over sixty years, NAEYC has worked to promote high-quality early childhood programs for all young children. One major strand of activity to support these goals has been facilitating the professional development of individuals who work for and with children from birth through age eight. The purpose of this study was to evaluate the aspects of program planning and delivery for a social studies standards initiative. This study worked in conjunction with state level efforts to provide professional preparation for

those in early childhood programs, Although the efforts vary considerably from state to state, the exemplar in this study, the State of Ohio, provides a snapshot into what is gained regarding the specialized skills and knowledge needed for effective social studies teaching and learning.

The data support that early childhood educators are implementing many activities/lessons in their settings that correspond to all seven of the early learning social studies standards. Many of the respondents associated the appropriate standard to their corresponding activity(ies) but didn't note the benchmark and indicator to these activities. Even though the respondents didn't specifically address benchmarks and indicators, responses to research questions one and two identify how their activities were aligned with standards, benchmarks and indicators. The two case studies further demonstrate the teachers' use of the social studies standards through "back-mapping" activities and using the standards for planning their curriculum.

While there are no specific barriers indicated to prevent early childhood educators from implementing the early learning social studies standards in their early childhood settings, there are significant barriers to improving early childhood professional development within the system. There is little incentive for those that are paid little more than minimum wage to seek extended day professional development opportunities, due to the type of setting or composition of the children. Some respondents stated their inability to find an opportunity to apply certain standards in their classroom, which may suggest a barrier or a lack of understanding of the specific social studies standard, benchmark or indicator.

Changes made to a social studies activity for a child with special needs were primarily indicated for only those children who had specific disabilities. There was little reference to Universal Design of Learning Principles. There is some indication that early childhood educators are integrating books representing multicultural literature into their settings; however, these books weren't evaluated so it is unclear as to the quality of this multicultural literature. "Multicultural literature must meet the general quality standards applied to all other literature, such as well-developed plots, settings, theme, and characterization, style and point of view" (Kiefer & Tyson, 2008, p.11). In the evaluation of any multicultural literature it is most important that *any* book chosen for use with children be of high literary quality (Lu, 1998; Bishop, 1992). While we have seen an increase in the number of quantity of multicultural literature, in comparison to the overall number of titles published each year, there are relatively few. Therefore, given the limited number of quality multicultural children's books available, the quality of the book selected is even more important to remember since "there may be a greater tendency to accept poor literary quality just to have *something* in the classroom or library" (Bishop, 1992, p. 48).

Overall, professional development for early childhood educators is often sporadic. It is connected to the states' childcare licensing requirements and rarely to the development of curriculum. This approach makes it difficult to provide approaches to curriculum development for a specific content area. Moreover, the brevity of the professional development program might hinder participants from fully bridging their learning from the modules into their classrooms. Professional development that effects change must be conducted over time and with networks of support.

A number of states and communities are beginning to develop professional development plans with social studies content knowledge at the core. There is a need for further research to assess the breadth and depth of content knowledge related to social studies for young children who are at different developmental levels and from a range of socio-economic, cultural and linguistic backgrounds. On the other hand, a simple survey with easy-to-complete Likert-type items can also be conducted in the future to reach more people's opinions and experiences, and to make generalizations to the target group. As response rates to questionnaires of 20-33% are more common (Berends, 2005), about 50-75 participants would be sufficient to gain more general information on their usage of social studies standards in their curricula.

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Laurie Katz is an Associate Professor in Early Childhood Education in the School of Teaching & Learning at The Ohio State University, USA. Her research, teaching and service have focused on teacher preparation of early childhood educators, inclusion issues, relationships between families, communities and schools, and narrative styles and structures of young children.

Hatice Zeynep Inan is an Assistant Professor in Early Childhood Education at The Dumlupinar University, Turkey. Her current interests include early childhood education and Reggio Emilia Approach, and she teaches courses on child development, early childhood education and research at undergraduate and graduate level.

Cynthia A. Tyson is an Associate Professor in the School of Teaching and Learning at The Ohio State University, USA. Her research and scholarship interests include teaching for social justice, early childhood social studies and multicultural children's literature.

Adrienne D. Dixson is an Associate Professor in the School of Teaching and Learning at The Ohio State University, USA. She teaches courses on Critical Race Theory and education and urban education. Her research focuses on race and racial and gender identities in urban schooling contexts.

Hyun Young Kang is a doctoral candidate at The Ohio State University, USA. Her current interests include early childhood education and curriculum, and teacher education.

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Appendix A

States with PreK Social Studies Standards

	State	Source	Date
1	Arizona	http://www.ade.state.az.us/	April, 2007
2	District of Columbia	http://www.k12.dc.us/	April, 2007
3	Florida	http://www.fldoe.org/bii/curriculum/SSS/	Oct, 2009
4	Illinois	http://www.isbe.state.il.us/	April, 2007
5	Kansas	http://www.ksbe.state.ks.us/	April, 2007
6	Kentucky	http://education.ky.gov/KDE/	April, 2007
7	Louisiana	http://www.doe.state.la.us/lde/index.html	April, 2007
8	Maine	http://www.maine.gov/education/	April, 2007
9	Maryland	http://www.marylandpublicschools.org/msde	May, 2007
10	New Jersey	http://www.state.nj.us/education/	May, 2007
11	Ohio	http://www.ode.state.oh.us/GD/Templates/Pages/ODE/ODEDefaultPage.aspx?page=1	May, 2007
12	Pennsylvania	http://www.pde.state.pa.us/	May, 2007
13	Rhode Island	http://www.ridoe.net/	May, 2007
14	South Dakota	http://doe.sd.gov/	May, 2007
15	Tennessee	http://www.state.tn.us/sbe/	May, 2007
16	Vermont	http://education.vermont.gov/new/html/pubs/framework.html	Oct, 2009
17	Virginia	http://www.pen.k12.va.us/	May, 2007
18	West Virginia	http://wvde.state.wv.us/policies/csos.html	Oct, 2009

Appendix B

Sample Survey

Thank you for attending the 3 sessions of the Ohio Early Learning Content Seminars in Social Studies. We are interested in learning how you implemented (or were unable to implement) some of the concepts and ideas from these modules within your preschool setting. Please respond to the following below.

1. Provide an example of an activity where you used a social studies standard in your preschool setting. Please state the standard with the accompanying benchmark and indicator.
2. From this example, explain how this activity was developmentally appropriate (i.e. addressed the physical, social-emotional, cognitive and/or language needs of your children)
3. Provide 1 or more examples of how you planned and implemented developmentally appropriate activities related to the teaching of social studies concepts and skill development. Choose from the following. If you are unable to provide any examples, please describe the reason(s).

Teaching about different cultures
Teaching about citizens rights & responsibilities
Teaching about the government
Teaching about geography
Teaching about history
Teaching about economics

Provide an example(s) of how the children developed social studies skills and methods. How did they get information from oral, visual, print and/or electronic sources to learn about social studies' content.

Describe how you made changes to a social studies activity for a child with special needs. (Briefly describe the child) Please explain your reason(s) if you didn't make any changes.

6. How did you use children's literature as part of your social studies activity (give examples of books)
7. We will be conducting follow-up phone interviews or group meetings to further discuss your social studies activities. Would you be interested in participating?

Underline or circle *yes* or *no*

Thank you for your responses. Please complete the identifying information unless you wish to remain anonymous.

Name: block letters
Name of preschool setting:
Phone number: Home/work
Email address:
Location of modules

Appendix C

Interview Protocol

Thank you for completing the survey that was sent regarding how you may have used the information from the social studies modules in your early childhood site.
The purpose of this interview is to expand on what you've written on your social studies survey. We are interested in further learning what types of social studies activities/lessons or other resources you are using in your early childhood site that is connected with information presented in the 3 social studies modules. We are also interested in barriers that prevented you from using the information from the modules.
The phone interview will last from about 20-45 minutes.
Interviewee's educational level
Position in the early childhood setting
Describe your early childhood setting (where is your setting housed? Other programs in this building?
Number, ages, ethnic backgrounds of children in setting
Number of children with certified disabilities (Individual Education Plan or Individual Family Service Plan) (Briefly explain the disability)
You mentioned an activity where you used a social studies standard in your early childhood setting. Will you please elaborate on this activity; provide details about
Materials/ resources used
Literature
People brought into the classroom (family/community members)
Activities outside of the classroom
Explain how this activity addressed the sensori-motor, social-emotional, communication and/or the cognitive needs of your children.
Explain how the children obtained information to complete the activity. Explain how this information was provided orally, visually, print and/or electronically.
Changing the activity to address the needs of a child with a disability.

Describe other activities/lessons that were taught related to the social studies standards that pertain to the following. Use (a-g) with each bulleted topic.
different cultures
different family structures
citizens rights & responsibilities
government.
geography
history
economics

Thank you for your interview. We are interested in making some site visits to learn more about the implementation (or difficulties) in teaching about the social studies standards in early learning settings. Would you be interested in being one of these sites?

Appendix D

Case Study Observation Protocol

General information of classroom population – number of children, ages, ethnic, racial, socio-economic backgrounds, special needs (no identifying information will be needed)

Physical lay-out of the preschool setting (if family provider – what part of house is used for the setting, church, school – other classes in the same building.

Examples of lesson/activity planning related to social studies standards

Children's work – products related to social studies standards

Artifacts – books, materials, other resources (including people from the community) used for the "social studies" activity

Interview with teacher re: how s/he used social studies activities in the classroom or what barriers contributed to problems using any social studies activities in the classroom.

Areas of social studies content: Different cultures, citizen rights & responsibilities, government, geography, history, economics

We won't be taking artifacts from the setting but it would be helpful to take pictures (with permission)

Appendix E

Study Population

Respondents	Type of childcare facility	Data Sources
1. Dee	Family childcare (typically-developing)	Survey
2. Cindy	Preschool center (typically-developing)	Survey
3. Becky	Preschool center (special needs)	Survey
4. Judy	Preschool center (special needs)	Survey
5. Mary	Preschool center (typically-developing)	Survey, Interview, Site Visit
6. Rebecca	Family childcare (typically-developing)	Survey, Interview Site Visit
7. Valerie	School district (special needs)	Survey, Interview
8. Jackie	School district (typically-developing)	Survey
9. Tina	Preschool center (typically-developing)	Survey
10. Beth	Preschool center (typically-developing)	Survey
11. Mindy	Preschool center (typically-developing)	Survey
12. Wendy	Preschool center (typically-developing)	Survey
13. Jill	Montessori school (typically-developing)	Survey
14. Aida	School district (special needs kindergarten)	Survey
15. Sharon	Preschool center (typically-developing)	Survey
16. Connie	School district (special needs & typically developing)	Survey
17. Kathy	Preschool center (typically-developing)	Survey

* typically- developing: settings with children who are predominantly "typically-developing"
* special needs: settings with children who are predominately children having special needs

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A matter of prior knowledge: Canadian young children's conceptions about the future in the global community

Ottilia CHAREKA*
St. Francis University, Canada

Abstract

Young Canadian boys and girls aged nine to eleven were asked to consider their personal futures, the future of their community and the future of the world. Mixed methods were employed for data collection and analysis. Responses were compared with those given by children in eight countries and the discussion focused on the importance prior knowledge, in this case, prior knowledge of global issues, holds for effective teaching and learning about global issues. Canadian children were optimistic about the future for themselves and their community but less so for the globe. More so than other children, Canadian children were concerned with issues of social justice, issues such as discrimination and racism, and with improving the environment, which might be attributed to the emphasis that is placed on these issues in their school curriculum. Assessing prior knowledge should be a priority for those considering development and implementation of global education curricula.

Keywords: Global community, young children's conceptions, prior knowledge

Introduction

Canadian curriculum standards in social studies, citizenship education and global education employ the language of constructivism, emphasizing that prior knowledge is of paramount importance for the design and implementation of effective teaching and learning activities for children. Learning theorists have long argued that teachers must first familiarize themselves with children's prior knowledge (Newmann, Marks & Gamoran, 1996) and this is a fundamental component of constructivist approaches to teaching and learning (see, for example, Chareka & Sears, 2005, 2006; Windschitl; 2002 and DeCorte, 1990). While various terms have been used to describe the concept of 'prior knowledge', terms such as 'prior conceptions', 'misconceptions' or 'naïve understandings' (Byrnes & Torney-Purta, 1995; Hill, 1995; Minstrell & Hunt, 1991), a common aspect of these

* E-mail for correspondence: ochareka@stfx.ca

terms is that prior knowledge should serve as a critical springboard for teaching and learning processes. Dochy, Segers and Beuelh (1999) define prior knowledge succinctly as "The whole of a person's actual knowledge that is: (a) available before a certain learning task, (b) structured in schemata, (c) declarative and procedural, (d) partly explicit and partly tacit and (e) dynamic in nature and stored in the knowledge base" (p.146). Despite broad recognition that prior knowledge is important, there is no evidence that students' prior understandings are taken into consideration in the construction of curricular standards (Peck & Sears, 2005; Peck, Sears & Donaldson, 2008).

This study was initiated to explore young Canadian's hopes, fears and concerns about the future and about what it means to be an active citizen and to be a 'good' citizen in their local and global communities. Canada was invited to participate in a large international study led by Cathie Holden of the University of Exeter in the United Kingdom, but Canadian participation amounted to a pilot study in Atlantic Canada with a sample of 40 students - a larger, Canada-wide study is planned with a sample large sample of students from all the provinces and the three Territories in the near future as research funds are being applied for. Therefore, readers need to keep in mind that the sample size from which this paper is based is one of the major weaknesses and hence the generalizability and/or transferability of the research findings should be more focused to the target population at this school and province rather than Canada wide. However, despite the small sample size, this study did provide some foundation for comparing the hopes and fears of Atlantic Canadian children with those of their counterparts in the United Kingdom, Spain, Pakistan, Ukraine, Kyrgyzstan, Korea, South Africa and Gambia and also helped me to shape the proposed large Canadian study to be carried out soon.

Dean (2008) suggests that understanding the futures that children envision will help educators to develop the best ways to prepare children to work towards those futures (also see Barton, 2001; Holden, Joldoshalieva & Shamatov, 2008; Naval & Reparaz, 2008). Research on children's views of the future is crucial, as the attitudes and prior knowledge they hold influences what they are prepared to contribute as active citizens both in school and in their community, now and perhaps in the future. In a changing world, with increasing access to technology and the media, are young children becoming more aware of civic and global issues? Merryfield (2008) also believes that today's students need global awareness in order to survive. Moreover, she suggests strategies for increasing awareness of the outside world by encouraging students to see events from the perspectives of other cultures, listen to voices from other parts of the world, and investigate the impact of connections. .How do children see their future and what hopes and fears do they have for themselves, their local communities and the world in comparison to their counterparts and their level of civic

consciousness beyond national boundaries? (see also Merryfield, 1998; 2004; Merryfield, Tin-yaulo, Cho po & Kasai, 2006; 2008)

At present, the world is a rapidly-changing place with many new technologies, increased global conflict and important political, economic, social and environmental changes taking place at a rapid rate. There is need for young children to understand other perspectives as Merryfield (2004) argues that without understanding of locally and globally, issues, young children cannot make sense of issues that affect their lives and also cannot make informed economic, political, and environmental decisions as future citizens, hence, the paramount importance and significance of this research. The study of young Canadian children was initiated to explore how children are responding to those changes: 1) to describe the hopes and fears of Canadian children with regard to personal, local and global futures; 2) to describe Canadian children's understanding of local and global issues; 3) to describe the extent to which Canadian children feel their schooling has helped them to understand local and global issues and their role as active citizens who can work for positive changes and 4) to compare our study of Canadian children with the results of studies conducted in eight countries.

A summary of key facts about Canada, particularly Atlantic Canada where the study was conducted, is provided here to describe the context within which the conceptions and prior knowledge study participants expressed were developed:

Atlantic Canada has a population of 2,331,900 (July, 2006) living in four provinces. The official languages are English and French and the economy was relatively strong in Canada in 2006 when this study was carried out. The Gross Domestic Product was growing by 2.7% and much of the strength of the economy was and still is attributed to the growth of the economy in the province of Alberta, where the energy sector boomed with the development of oil sands in the northern part of the province. This development in the western part of the country produced the largest inter-provincial movement of people since 1972. Many people from Canada's Atlantic provinces took advantage of employment opportunities in Alberta by moving there for work. The average total income for a family of two or more people in Canada was $83,500 and the unemployment rate in the country was 6.3%.

Education

Education is a provincial responsibility in Canada, although some federal Canadian standards have been established. Within, Atlantic Canada, much of the curriculum has been developed for use in all four Atlantic Canadian provinces. The education system in Atlantic Canada has three levels: elementary grades primary to grade four (5 to 10 years of age); middle school grades five to eight (10 to 13 years of age); and high school grades nine to twelve (14 to 18 years of age). Two systems of education, private and public, are in operation with the majority of Atlantic Canadian children

attending the public school system - this study was conducted at a public school.

While a formal curriculum covering citizenship education and global awareness has not been developed for Atlantic Canada, elements of these topics appear in several areas of the curriculum, especially in Social Studies. Students are encouraged within English Language Arts programs to explore and to discuss their thoughts, ideas and experiences, and to consider and listen critically to others' opinions and ideas. Students are also expected to identify examples of prejudice and stereotyping in oral language. In Health Education, students are encouraged to demonstrate proactive strategies for enhancing the social and environmental health of the school, while they are encouraged to discuss various aspects of friendship and relationships. Citizenship is also defined in the context of the school community. In Music, students are introduced to and learn about music of other cultures, while in Science students are introduced to habitat conservation, conservation of energy through use of efficient home lighting, noise pollution and the effects of wind, water, ice and natural phenomena on the landscape. In Social Studies, students learn about the human landscape of Canada, the Canadian federal government and the symbols of Canadian heritage (Nova Scotia Department of Education, 2004). It should also be noted that Canada is one of only two nations, with Australia, that have implemented an official Multiculturalism Policies. These policies, with respect to multicultural education, tend to focus on racism, while diversity issues, social justice and equity concepts are infused across the curricula. In addition, there is quite a strong focus on environmental issues in Atlantic Canada where the provinces have a well-established and strict system for recycling and composting and where schools are becoming more and more integral in the process of educating students on environmental issues.

Sample

As mentioned earlier, the Canadian sample was the smallest for studies conducted in countries participating in this study as it was planned to be a pilot study. A total of 40 children in grades three and four participated in this study while researchers in other countries worked with a minimum of 100 to a maximum of 200 children. As in other countries, Canadian Children were aged between 9 and 11 years and included 27 girls and 13 boys. All children in the Canadian sample attended the same public school.

Methodology

As noted, this study was conducted in conjunction with an international study on the conceptions children hold about their hopes and fears for the future. Each student completed a questionnaire, which included closed-ended and open-ended questions. Closed-ended questions were answered using a three point or a five point scale while open-ended questions prompted participants to describe their thoughts in writing and even to draw pictures if they wished to do so. The questionnaire was adapted and

appropriately translated for participants in countries where English is not the primary language or the medium of instruction.

Students were asked closed-ended questions about their thoughts on how life would be for them, their community and the world in the future, how issues such as unemployment, conflict, prejudice, health, the environment and poverty would change and finally, how they act for change in terms of what they have learned in school about each topic. Two methods were used to analyze study data: descriptive statistics were prepared for responses to closed-ended questions and compared for gender and year group; responses to open-ended questions were coded for emerging conceptions or misconceptions - these codes were represented statistically in terms of the percentage of children who voiced these conceptions or misconceptions and then compared by gender and age group. All responses were compared with responses to these questions given by children in other countries.

Results

Canadian children were first asked to assess their own future, the future of their local community and the future of the global community using a five-point scale to indicate if they thought the future in general would improve, stay the same or be worse.

Table 1. *Canadian children's response on future life*

Response	Personal (%)	Local (%)	Global (%)
Much Better	46	31	21
A Bit Better	41	36	38
About the Same	10	21	18
A Bit Worse	-	5	13
Much Worse	-	5	8
No Response	3	2	2

Virtually all the Canadian children in this study are optimistic about their personal life in the future with 97% believing it would be the same or better as compared to the United Kingdom with 39% and Spain with 38%. Surprisingly 83% of children in a poor nation, the Gambia, believed that their personal lives would be much better in the future. Students from all countries visualize a slightly better future for their global community and local community, either indicating the future would be the same or improve. Canadian children's specific conceptions which emerged about their hopes and fears for the future are represented below.

a) Hopes

Using open-ended questions, students were asked to describe their hopes for, not only their own personal future, but also for the future of their local

community and the global community. Their responses are shown in Table 2, Table 3 and Table 4 below.

Table 2. *Canadian children's responses on hopes for personal future*

Response	Boys (%)	Girls (%)
Job Aspirations	58	74
Relationships	66	55
Material Possessions	50	37
Ambitions	33	26
Education	8	26
Health	-	11

Table 3. *Canadian children's response on the future of their local community*

Response	Boys (%)	Girls (%)	Total (%)
Environment	58	81	74
Local Facilities	100	52	69
Community Issues	25	37	33
Poverty	33	37	36
Violence and Crime	25	11	15
Health	8	7	8

Table 4. *Canadian children's responses on hopes for the global future*

Response	Boys (%)	Girls (%)	Total (%)
Poverty	67	63	64
No War	67	59	61
Environment	42	55	51
Relationships	17	37	31
Justice	-	15	10
Health	42	22	29
Education	0	7	8

It is clear from these responses that these young students have different conceptions of hope for their personal future, than they do for the future of their local area or the future of the world. The personal hopes of the students were expressed in relation to job aspirations or relationships. Interestingly, boys in this sample deemed relationships more important than girls did but this difference may be related to the small sample size. In terms of the local community, Canadian children's conceptions centre on the environment and the local facilities that they wish were available. Every boy in the sample made reference to at least one local facility that was desired. Generally, they were less likely to hope for reduction of crime and violence. Globally, these young Canadian children were most concerned with war and poverty and this group was quite unlike children in other countries as their responses created a new category of conception which was coded as

'Justice'. The 'Justice" category described comments by some of the Canadian girls who hoped for better laws, better human rights, more freedom, less discrimination and racism and more justice.

b) Fears

Students were also asked to describe their fears in relation to their personal future, the future of their local area, and the future of the global community. The results for each open ended question asked are shown below. Since each student was asked to choose three fears, the percentages total more than 100%.

Table 5. *Canadian children's responses on fears for their personal future*

Response	Boys (%)	Girls (%)	Total (%)
Health	58	63	61
Success and Failure	67	59	59
Relationships	42	44	44
Being a Victim	42	11	20

Table 6. *Canadian children's responses on fears for the future of their local community*

Response	Boys (%)	Girls (%)	Total (%)
Poverty	50	63	59
Environment	58	63	61
Community Issues	25	22	23
Disasters	-	22	15
Violence and Crime	50	33	38
Health	8	22	18
Facilities	17	15	15
Traffic	-	7	5

Table 7. *Canadian children's responses on fears for the global future*

Response	Boys (%)	Girls (%)	Total (%)
Poverty	33	33	33
War	75	55	61
Environment	42	85	72
Relationships	-	4	2
Disasters	8	30	23
Health	50	4	18
Violence and Crime	17	22	20

Canadian children seem to share more fears than they do hopes for the future. On the personal level, children are worried about success and failure while at the local level children's fears were focused strongly on the

environment and poverty. It seems that children in this Canadian sample are more aware of poverty than their counterparts in other countries even if poverty does not directly affect their lives. At the global level, Canadian children are most concerned about the environment and war – boys were most concerned about war, while girls were most concerned about the environment. Again, as noted above, it is possible that the small sample size skews the results in favor of girls' however, even with taking the sample size into account; boys mentioned health related fears much more often than girls did and the environment is certainly more of a concern for the female portion of this sample.

c) Concerns about specific issues

Once students had responded to questions that focused on their hopes and fears for the future, they were asked to talk about specific issues that they feel are affecting the world. Children were asked to indicate whether they thought there would be more, about the same, or less violence, unemployment, prejudice, environmental problems, poverty, and healthiness in their local community and in the world. The following graphs illustrate their responses.

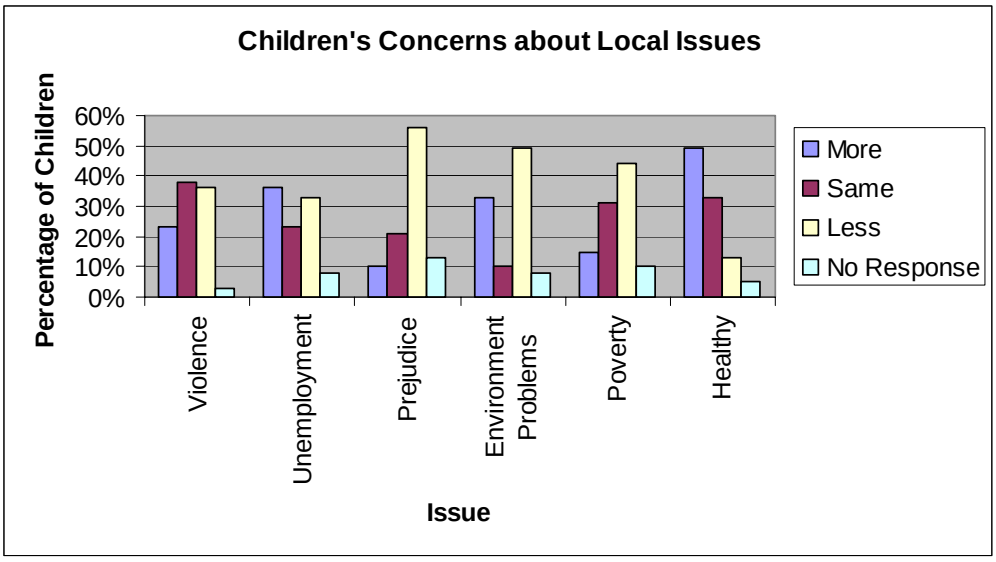

Figure 1. Canadian children's concerns about local issues

Canadian children felt that violence would be about the same in the future and show little optimism with regards to unemployment in their local area. In other areas the children were extremely optimistic about the future predicting less prejudice, less poverty, fewer environmental problems and better health. Again, the responses with respect to environmental problems may be attributed to the girls' optimism as female respondents more than doubled the males.

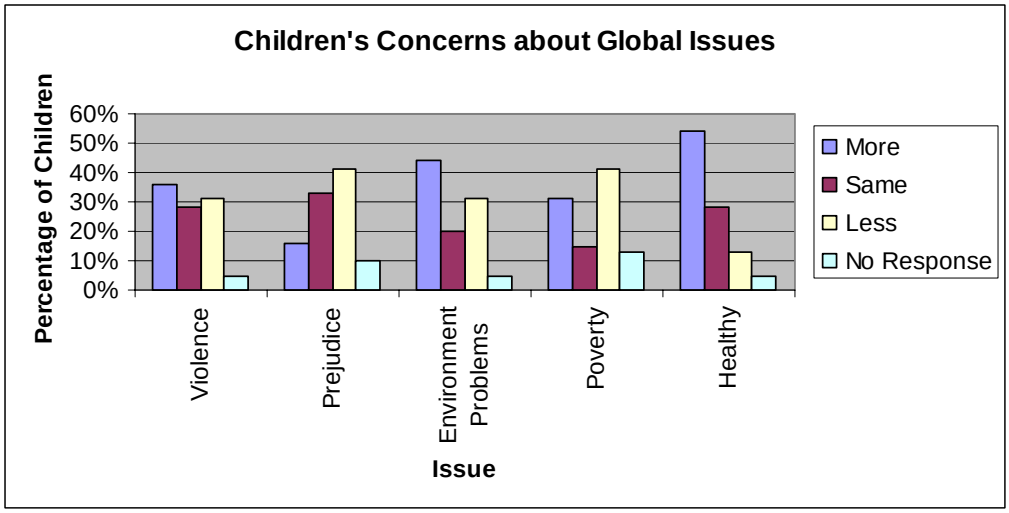

Figure 2. Canadian children's concerns about global issues

For the most part, Canadian children were more optimistic about global issues than they were about local issues. Globally they felt that there would be more violence but that locally there would be the same levels of violence. The children also believed that there would be less prejudice and less poverty in the world, but are much less optimistic about these issues than they were when considering their local community. Like their vision for their local community, the children felt that people in the world would be much healthier in the future - health is the only issue that elicited relatively similar responses for the local and global levels. Canadian children's conceptions about global environmental problems are pessimistic as most felt that environmental problems would be more prevalent in the world in the future.

d) Action for Change

In addition to probing for hopes and fears and local and global issues, the questionnaire also asked students for their plans for action. How many of these students are involved in local or national organizations? How important do they think the issues are and how much have they learned in school? To gain an understanding of Canadian children's prior knowledge of global issues, the students were asked if they thought it was important to learn about global issues at school. 64% indicated that it was very important to learn about global issues at school and 28% indicated that it was important. However, when asked how much they have learned about global issues at school, only 15% responded that they had learned a lot. Most girls responded that they had learned a little, with 67% of the children responding that they had learned only a little.

Given that students felt that they had learned only a little about global issues at school, it could be assumed that they did not engage in many activities at school that were related to global issues. When asked to

give examples of things they had done at school, the children replied overwhelmingly that they had been involved with environmental-type activities such as keeping the school litter free, recycling and learning about global warming, rainforests and the environment. The children also indicated that they had learned about beliefs and values in their school, stating that they had covered topics such as racism, poverty and bullying. The students also remembered learning about health issues and news events such as war, tsunamis and the flood in New Orleans. In terms of action, the students indicated that they had raised funds and supported the food bank. Again, in the minds of these children the environment is the issue that they encounter the most in school.

Children were also asked if there was anything that they could do to help make the world better. All except five percent of the children responded that they believed that there was something they could do, they were divided however as to whether there was a little or a lot that they could do. Despite believing that they could do something, when asked if they were involved in any local or national organizations, 20 of 39 students indicated that they were not members of any organizations, while 16 students did not respond. Assuming that the children who did not respond do not belong to any organizations, less than 1% of this sample is involved in any organization that might challenge these students to work on a practical level on the issues that were of concern to them.

While not involved in any type of organized group, respondents did give examples of things they could do to help make their community and the world a better place. Students indicated three main categories of world-improving activities; the environment, actions and relationships. They mentioned picking up litter, recycling, composting, donating money and being respectful and cooperative with others. Students also mentioned keeping fit, not smoking or taking drugs and getting a good education. All of the children in the sample mentioned at least one thing that they could do to improve and protect the environment and to build relationships. When it came to actually doing something, however, very few had done the activities they suggested.

Discussion

As reminder to the reader, it should be noted that the generalizability and/or transferability of this study is limited in particular to the sample and the school target population as the sample was small and meant for the Canadian pilot study. However, although this study involved a small sample of young Canadian children from one school, the children involved in this study have provided much insight into the prior knowledge they have with respect to their hopes, fears, concerns, and actions in the local area and the global community. Much of the data speaks directly to the environment these children live in and the information they are gathering from those around them. More than students in other countries, this group was

concerned with environmental issues. And, more than children in other countries, these children could give examples of activities they were doing at school to improve the environment. The strong focus on the environment for these children may be a result of local efforts in Atlantic Canada to reduce waste and to encourage people to participate in recycling programs. In Canada's Atlantic Provinces, the curriculum has a particular focus on environmental practices ranging from conservation of energy and reduction of waste to weather-related issues and global warming. These students are not only learning about these environmental issues in school, they are provided opportunities to act on their concern at school, at home and in the local community. This study shows that there is a strong tendency for these students to participate in environmental activities, especially to participate in activities related to recycling.

Despite their strong interest in the environment, some of the Canadian children seem to hold misconceptions or naïve theories in their thinking and understanding about the environment and the things they can do to improve the environment. Their understanding seems to be limited to the environment within the school walls and their back yard and focused simply on picking up litter and recycling at home and in the community. Most of them did not perceive that their life style might be detrimental to the environment. For example, when asked to envision their future as adults some children drew pictures of their family of four people (father, mother and two children-boy and girl) each with full bathroom, air conditioner, fridge and other electrical gadgets in each one's bedroom. In some cases, children envisioned that the father would have a large truck, the mother a big Sports Utility Vehicle and each child would have a car.

Globally, respondents were concerned about poverty, war, the environment, racism, discrimination and acts of injustice. Though aspiring to be 'good' citizens and having a clear conception and some prior knowledge of these issues, they seemed to lack vision about their own abilities to become involved with these issues. Perhaps, living in an affluent country contributes to this misconception in their way of thinking. The results from this school in particular, indicate that teachers should move beyond teaching citizenship education at a theoretical/factual level and begin to help students to envision practical solutions to issues that concern them. Teachers could help these students to think beyond the little acts they might engage in at school and help students to see how they might contribute more substantially.

Importantly, a new code was developed for this study for the concept "social justice". The Canadian participants in this study indicated very strongly and clearly that there should be neither discrimination nor racism in their local communities nor in the global community. They were strongly pro-diversity, pro-social justice and pro-equity. This was an outstanding conception for these Canadian children to identify given that these children live in a small community and may not experience discrimination or racism.

The prior knowledge about discrimination and racism shown by these Canadian children indicates that Canada's Multiculturalism Policy and diversity issues are being taught at this school and that the message is having an influence on the way these children approach the world. It would be interesting to explore how these children would react to scenarios depicting discrimination and racism and to follow these children as they grow to see how they face discrimination and racism and promote social justice and equity in the future.

Most of the children in this sample, regardless of gender, centre their personal concerns on job aspirations, relationships and material possessions which seem to reflect the focus in schools on developing positive relationships with others. Several of these children want to get married, have a family and have lots of friends. They also have specific job aspirations and were able to indicate exactly what they would like to become in the future. Even at a young age these children have begun to set a direction for their own futures. These Canadian children were more interested in the material possessions they would obtain in the future than were most children from developing countries possibly because they live in a wealthy country and are inundated by advertisements. While Canadian boys are more interested in obtaining material possessions than Canadian girls, overall, children from the United Kingdom are still at the top of the list in terms of wanting many material possessions (Holden, Joldoshalieva & Shamatov, 2008).

In keeping with their optimism, these children were not overly pessimistic about any issues in their local area, except regarding unemployment in the future. This may be because many Atlantic Canadians had migrated west to find work during the time of the study. Many respondents in this study were living in a situation where one parent was working in the west and returning home periodically, while many others were losing friends to the westward migration of Atlantic Canadian residents.

Several children were concerned about war and poverty perhaps because much media attention is devoted to wars occurring around the world. Canadians were more concerned with poverty than children from the United Kingdom, the other largely developed and wealthy country in the study. Again, the ability of these children to reflect on global issues might be due to the influence of teachers and the curriculum in Atlantic Canada, especially the foundation Social studies document which focuses on global education.

Interestingly children from war torn countries in Africa and Asia, children from Pakistan for example, were more optimistic about peace in the future at both local and global levels, than Canadian children. While Canadian children are concerned about war, poverty and environmental issues, they are considerably less concerned with crime and violence than

children from the United Kingdom and South Africa (Holden, 2008; Holden, Joldoshalieva & Shamatov, 2008). Canadian children's prior knowledge here may be limited because they are not affected by violence and crime in their local area, and thus do not consider violence and crime as threats in the world at large. Canadian respondents may children just view other issues as being more important than do their counterparts in other countries.

This study suggests that educators and parents in Canada, and particularly in the Atlantic provinces, are doing a formidable job of preparing children for the future, especially with regard to recycling programs and their impact on the environment. This study indicates that it is important to teach children about global issues in schools and that it is also important to reinforce and personalize those concepts at home. As Naval and Reparaz (2008) argue in a similar study they did with Spanish children, if school and family work together for this single purpose, then the education of children will be positively influenced and the students will become 'good' citizens, involved in society and focused on its needs and problems. Children need to be given opportunities to learn about and to grow as global citizens. Canadian children in this study have shown that they believe that global education in the school system is important but feel that they are too little to do anything. Perhaps it is time for Canada and other countries to develop curriculum devoted specifically to civic and global education.

A significant body of research also demonstrates that prior knowledge is a key factor influencing learning and is central to this study. Ausubel (1968) and Hartman (1991) point out that meaningful learning depends on organizing material in a way that connects it with the ideas in the learner's cognitive In other words how we think influences how and what we learn. Therefore, understanding students' prior knowledge is essential to good teaching and new learning. Learners come to any learning situation with certain prior knowledge, which, at times, might be misconceptions or naïve theories (Byrnes and Torney-Purta, 1995). Therefore, it is crucial that teachers understand their students' prior knowledge and build or refine instructional techniques and resources accordingly. In fact, Hunt and Minstrell (1997) argue that children's difficulties in learning occur when prior knowledge is not taken into account. This creates communication barriers between the students and adults (teachers). Learners suffer internal conflict if they are taught new material which contradicts their previous understanding. At times, existing schemata can be difficult to change.

In the field of constructivism, it is widely accepted that teachers should act as facilitator to students' experience in the world around them. Griffin and Cole, (1984) claim, "Instruction should be designed to support a dialogue between the child and his or her future; not a dialogue between the child and the adult's history. Adult wisdom does not provide teleology for child development." (p.1).

Students rely heavily on their prior knowledge when faced with learning new concepts. In fact, development of conceptual framework maps new learning situations via our experiences and what we already know in the world. It is a process of discovering reality in 'our world', interacting with it and transferring that understanding into the mind, forming internal representations that determine subsequent interactions with the environment around us. So if one is to teach effectively, one needs to assess and understand where the students' level of knowledge currently stands in relation to the concept to be taught. For example, Driver and Easley (1978) characterize learning scientific concepts as being initiated into ideas and practices of the scientific community that already exist (prior knowledge) and making these ideas and practices meaningful at an individual level. Therefore, before introducing new concepts, the teacher needs to find out whether the students are close to each other's level of understanding. At the same time, the teacher should also find out if the students hold preconceptions; these are ideas not yet fully understood, or misconceptions. In these cases students might have been taught formal theories but misunderstood them or misinterpreted them. Also, the teacher should find out whether the students hold alternative frameworks; that is when students develop their own concepts through imaginative efforts. Peck (2003) strongly supports this and sees it as fundamental to the process of teaching and learning. She contends:

> As a teacher I have been advised on more than one occasion to take students where they are developmentally and teach them accordingly, seems a rational enough idea. I have come to realize, however, that before I can proceed with this advice, I first need to accomplish two tasks: 1) find out where students are developmentally-speaking, and 2) Explore ways to further their conceptual development, whether this implies a change of ideas or an extension of theories or both. (p.33)

The above thinking and assumption is very useful because it helps teachers to understand the schemata of their students. Schemata are always organized meaningfully, can be added as an individual gains experience in the real world. Schemata are then reorganized as new information is learned and restructuring of the concept. The schemata help in the formation of abstract and concrete concepts. The stored information is our prior knowledge and is the basis for new learning. It is essential for comprehending new information. From the above on-going discussion, understanding Canadian young children's prior knowledge on their conceptions, misconceptions or naïve thinking about the future in the global community in comparison to their counterpart is crucial in making consideration for future curriculum implications in Global Education and Global citizenship. Hughes and Sears (2004) present an analogy that is very useful in explaining prior knowledge:

> Think of student's prior knowledge or, as some would call it, cognitive schema, as a modular bookshelf. The supports and the shelves help to structure the pieces of knowledge that are represented by the books on the shelves. As the person acquires new knowledge – new books – a number of things might happen. The knowledge might fit well with what they already know and that book slides neatly on the shelf

> beside the others [Assimilation]. The knowledge might be something almost completely new and require a new shelf to accommodate it [Accommodation]. Another possibility, however, is that the knowledge is related to that on one of the shelves which already exists but does not seem to fit. It is like getting an oversized book which will not slide neatly on to the shelf. In this case the learner has some options. He or she can do what many of us might do with the oversized book and set it aside for the time being, perhaps putting it on the coffee table. They decide not to deal with the new knowledge, at least not for now. Another possibility is to turn the book sideways and slide it on the shelf that way [disequilibration according to Piaget or perturbation according to Dewey]. In other words, not accept the knowledge in the way presented but manipulate it so that it fits. This often means distorting the knowledge, creating or adding to misconceptions. (p.264)

In conclusion, the children in this sample were repeatedly optimistic about several issues and the future in general. The majority of respondents felt that their personal, local and global futures would be the same, if not better. Unlike their counterparts in other countries, these children hold extremely high hopes for their personal future, and slightly less optimism for the future of their local area and the global community. Also, this study indicates that schools should move beyond teaching citizenship education at the theoretical/factual level and encouraging students to become involved in little acts intended to save the environment. They need to use the prior knowledge; conceptions and misconceptions, like those expressed by children in this study, and help students to envision practical solutions for the world they want. The young student's schemata would help systematize or sort out what people know, and provide a framework for arranging new information being learned or encountered. One's own knowledge is part of one's prior knowledge and this can include correct conceptions, misconceptions or naïve theories. The schemata grow and change as new information is absorbed in relation to the whole process of learning. Research on prior knowledge has both theoretical significance and practical importance as it can help curriculum designers, educators-teachers and policy and program developers to obtain a clear picture of children's schemata and help them to reshape, further develop or improve relevant citizenship, global education and multicultural education programs. Also in the proposed large Canadian study, I would also like to focus and explore the impact of Canadian children's cultural and social capital levels on their prior knowledge as crucial lens or variables too.

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Ottilia Chareka is an Associate Professor in the Faculty of Education at St. Francis Xavier University in Canada. Her areas of specialization are global education, citizenship multicultural education and mixed research methods. She teaches both in the undergraduate and graduate programs.

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Enhancing pre-service elementary school teachers' understanding of essential science concepts through a reflective conceptual change model

Mehmet AYDENİZ*
University of Tennessee, United States

Clara Lee BROWN
University of Tennessee, United States

Abstract

This study explored the impact of a reflective teaching method on pre-service elementary teachers' conceptual understanding of the lunar phases, reasons for seasons, and simple electric circuits. Data were collected from 40 pre-service elementary teachers about their conceptual understanding of the lunar phases, reasons for seasons and day and night, and simple electric circuits pre and post instruction. Findings show that the instructional approach adopted by a science teacher educator had a significant impact on pre-service elementary school teachers' conceptual understanding of lunar phases, seasonal changes and simple electric circuits. The discussion focuses on pre-service elementary school teachers' misconceptions about the lunar phases, seasonal changes and simple electric circuits as revealed through their answers to the pre-test questions. Further discussion focuses on the implications of the findings for pre-service elementary school science teacher education.

Keywords: *Conceptual Change, Content Knowledge, Pre-service Elementary Teachers.*

Introduction

More than two decades of research on elementary school teachers' knowledge of science reveals that a significant number of them lack sufficient content knowledge and pedagogical wisdom to teach essential scientific ideas in their classrooms (Abell & Smith, 1994; Appleton & Kindt, 1999; Bencze & Hodson, 1999; Kennedy, 1998; Loucks-Horsley et al., 1998; Smith & Neale, 1989). Many of the teachers studied held conceptions about essential scientific ideas that are not congruent with scientifically acceptable ones (Atwood & Atwood, 1997; Aron, Francek, Nelson, & Bisard,

* Correspondence: maydeniz@utk.edu

1994; Galili, Bendall, & Golderg, 1993; Gilbert, Osborne, & Fensham, 1982; Glasson & Teates, 1989; Lane & French, 1994; Trundle, Atwood, & Christopher, 2002). This line of research reveals that students develop misconceptions for several reasons. These reasons are not limited to but include prior exposure to the scientific phenomena in natural settings, exposure to poor teaching of these concepts and lack of access to conceptual resources and experiences (DiSessa, 2002; Mayer, 2002; Vosniadou, 2002; Wandersee, Mintzes, & Novak, 1994). No matter what the source of these misconceptions may be science educators agree that both pre-service and in-service elementary school teachers hold misconceptions about some important concepts that are central to their practice (Asoko, 2002; Heywood, 2007; Schoon & Boone, 1998; Trundle et al., 2007; Webb, 1992). Addressing pre-service elementary teachers' misconceptions about essential science concepts is important for several reasons. First, the teaching of science in the elementary schools often takes place through reading or teacher explanations. Thus, the teacher is often viewed as the sole authority and the dispenser of knowledge that students must rely on for their learning (NRC, 2000). Second, subject matter knowledge is pre-requisite for sophisticated pedagogical content knowledge needed to teach science concepts effectively (Appleton, 2006). Finally, knowledge of subject matter is necessary for the teacher to effectively deal with questions that students may ask during instruction. If the goal of classroom instruction is to improve the quality of students' learning in science in elementary schools, science teacher educators need to pay close attention to pre-service elementary school teachers' conceptual understanding of science concepts that are central to the elementary school science curriculum. Although there is vast amount of research in science education on pre-service elementary teachers' content knowledge, much of research in this domain is descriptive (Trundle, Atwood, & Christopher, 2007). Trundle et al. (2007) call for studies that use interventions to bring about growth in pre-service elementary teachers' content knowledge.

The purpose of this study is to understand the impact of a reflective conceptual change model informed by the principles of situated learning on pre-service elementary school teachers' conceptual understanding of three science concepts: electricity, seasonal changes and lunar phases.

Review of Relevant Literature

A review of recent literature on elementary school teachers' subject matter knowledge and pedagogical preparation reveals that elementary school teachers are not well prepared to teach science. A comprehensive study conducted by Horizon Research, Inc. (2002) revealed only four percent of the 655 elementary school teachers have an undergraduate degree in science, and of the 86%, who graduated with an education degree, 40% have taken four or fewer semesters of science coursework (Fulp, 2002). The same study reports that only fewer than 3 in 10 elementary teachers felt well prepared to teach science.

Elementary school teachers' limited knowledge of science reflects how science is taught in the U.S. schools (Abell & Smith, 1994; Stevens & Wenner, 1996). The Trends in International Mathematics and Science Study (TIMSS) highlights that the percentage of science lessons that were judged to contain challenging science content in the U.S. schools remained at 19 % compared to the 25 % in The Czech Republic. The same study reveals that only 30 % of science lessons taught in the U.S. schools emphasized the learning of content with strong conceptual links compared to 70 % in Japan, 58 % in Australia and 50 % in The Czech Republic. More importantly, researchers found that 66% of science lessons in the U.S. classrooms focused on students' acquisition of facts, memorization of definitions and solving mathematical algorithms compared to 28% for Japan (Roth & Garnier, 2007). These findings highlight how the U.S. science education is behind some developing countries like The Czech Republic and the critical need for well-prepared elementary school teachers in science content and pedagogy.

Improving elementary school teachers' content and pedagogical knowledge has been a great concern for science educators since the launch of Sputnik by The Soviet Union (Heywood, 2007). As part of the solutions, science educators have taken different approaches in their efforts to enhance pre-service elementary school teachers' confidence in content and pedagogy (Alonzo, 2002; Heywood, 2007; Martin, 2006; Trundle, Atwood, & Christopher, 2007). One approach has been requiring pre-service elementary teachers to take a greater number of content courses (Schoon & Boone, 1998). The analysis of the correlation between an increased number of courses and confidence to teach science has revealed mixed results. Schoon and Boone (1998) suggest that content courses helped pre-service elementary teachers to build confidence only if students take courses that are specifically designed for elementary education majors. These courses were effective perhaps because more time was spent on how to teach the scientific concepts than just learning them (Alonzo, 2002; Appleton, 2006; Schoon, 1995; Schoon & Boone, 1998). Moreover, these courses have been proven effective because the instructors adopted pedagogical approaches that focus on fostering students' ownership over their learning rather than those that simply focus on the transmission of expert knowledge to the students (Alonzo, 2002; Appleton, 2006; Abell & Smith, 1994; Trundle, Atwood, & Christopher, 2007). In addition to student-centered pedagogies, science teacher educators must use assessment strategies that will enable students to explain scientific concepts to others, opportunities that will enable them to defend their theories, and learn science with others in a constructive manner (Abell & Smith, 1994; Butts, Kobolla, & Elliott, 1997; Settlage & Southerland, 2007).

This study is an attempt to make contributions to the ongoing discussion about addressing the learning needs of pre-service elementary teachers in science content and pedagogy.

Theoretical Framework: Conceptual Change

The theory of conceptual change guides the design of this study. Conceptual change is a widely respected theory of learning among science educators and cognitive psychologists alike (Driver, Asoko, Leach, Mortimer & Scott, 1994; Posner, Strike, Hewson, & Gertzog, 1982). The work of developmental psychologists such as Piaget (1978) provides the bases for the conceptual change theory (Bransford, Brown, & Cocking, 1999). The fundamental assumption of the conceptual change theory (Posner, Strike, Hewson, & Gertzog, 1982) is that learners' minds are not blank slates, they bring a fund of knowledge about how they think the physical and natural world works to the classroom (Bransford, Brown, & Cocking, 1999; Posner et al., 1982; Vosniadou, 2007). However, students' mental models of the physical and natural world are not often consistent with scientifically acceptable mental models about a particular science concept (Chinn & Brewer, 1993; DiSessa, 2002; Mayer, 2002; Vosniadou, 2007).

Proponents of conceptual change argue that through proper scaffolding and appropriate curriculum, students will be able to develop scientifically acceptable conceptions about the scientific phenomena (Chi, 2005; Mayer, 2002; Nussbaum, & Novick, 1982; Posnanski, 2002; Vosniadou, 2002). Conceptual change theorists (Hewson & Thorley, 1989; Posner et al., 1982) emphasize a set of conditions that are pre-requisite to conceptual change. These conditions include the following: (1) the learner must experience dissatisfaction with an existing conception, (2) the new conception must be intelligible, (3) the new conception must be plausible - the new conception must also be consistent with the learner's personal standards of knowledge, (4) the new conception must be fruitful and/or help the learner to solve problems or predict phenomena. It follows that learning experiences that are designed to bring about conceptual change must be consistent with these principles.

The initial assumptions of conceptual change viewed the process of learning through the assumptions of Piaget (1950) who explained the mechanisms through which the learner constructs and internalizes knowledge. Piaget suggested that individuals construct knowledge from their everyday experiences through the processes of assimilation and accommodation. The growth in learning was perceived to be the result of reorganization of concepts acquired through experience by these researchers (Greeno, Collins & Resnick, 1996). However, current learning theories assume that learning is a social process as much as it is a cognitive process (Vygotsky, 1978) and the growth in knowledge is assumed to result from social negotiation of concepts.

Lave and Wenger (1991) argue that learning should not be viewed as simply the transmission of decontextualized, abstract knowledge from the teacher to the student, but a social process whereby knowledge is co-constructed through negotiation of meaning by all members of a learning

community. In this social interaction, the learners are challenged to present, defend, revise and reconstruct knowledge until consensus is reached about the status of knowledge among all members of the community. However, social negotiation of knowledge alone may not be sufficient for long lasting understanding. Learning theorists who are proponents of situated learning theory believe that learning of concepts should take place in contexts relevant to their everyday use (Colins, 1988; Lave & Wenger, 1991). They maintain that learning is a result of the activity situated in the culture and context in which it takes place (Greeno, 1998; Lave & Wenger, 1991), and thus the learning environment should approximate the context in which the knowledge and skills learned will be used (Schell & Black, 1997).

The teaching methods informed by the principles of these current understandings of learning are assumed to engage students in meaningful and cognitively complex learning tasks, the end result of which may be conceptual change. We explain how we used the principles of these learning theories in the intervention section of this study to promote conceptual change among the participants of this study.

Methodology

Two sets of data served as the bases for our analysis: (1) participants' pre and post test scores, and (2) participants' drawings of the lunar phases, seasonal changes and simple electric circuits. We report the percentages of participants who provided correct answers to the questions that measured their understanding of the three concepts; the lunar phases, seasonal changes and simple electric circuits both before and after the intervention. Further analysis includes qualitative analysis of participants' drawings of lunar phases, seasonal changes and simple electric circuits (see Appendix B). The qualitative analysis helped us identify common misconceptions in participants' responses.

Participants and Data Collection

Participants for this study were 40 pre-service elementary school teachers enrolled in an Elementary Science Methods Course. The majority of participants enrolled in the course were students who majored in psychology and minored in education. All of the participants indicated that they learned about the lunar phases, reasons for seasons, and simple electric circuits at one point in their schooling experiences through a short survey. The age of participants ranged from 22 to 34. Only two of the participants were male.

We administered a pre-test (see Appendix A) to elicit participants' prior knowledge related to the lunar phases, seasonal changes and simple electric circuits. After participants took the pre-test, we provided them with three learning opportunities (see intervention) using multiple methods to bring about conceptual change in their understanding of the lunar phases, seasonal change and electricity. Participants took a post-test (the same as pre-test) that measured their conceptual understanding of the lunar phases,

seasonal changes and simple electric circuits at the end of the course. The pre-test and post-test were graded for comparison.

Intervention

The intervention consisted of three sequenced learning activities. The learning activities were designed according to the principles of social constructivism and situated learning in particular. A learning environment that is consistent with the principles of social constructivism creates conditions for conceptual change. Social constructivism assumes that learning takes place through a social and communicative process, whereby knowledge is shared and understandings are constructed (Aldridge, Fraser, & Taylor, 2000; Mercer, Jordan, & Miller, 1994; Tobin, Tippins, & Gallard, 1994; Vygotsky, 1978). Social constructivists maintain that individuals come to develop understanding through social interaction with others and by the use of cultural tools that the context of their learning makes available to them (Driver, 1995; Solomon, 1994; Tobin, Tippins & Gallard, 1996; White & Frederiksen, 2000). Situated learning theory states that individuals will construct knowledge when the learners are able to actively participate in learning in a meaningful context (Greeno, 1998; Lave & Wenger, 1991). Research also points out that learners' prior conceptions are rooted in their personal experiences, therefore, for conceptual change to take place, students must re-experience the phenomena (Gorsky & Finegold, 1992).

We started the intervention by problematizing participants' prior knowledge through two videos. The teaching of the lunar phases and seasonal changes was problematized through the private universe video (Schneps, 1988) and participants' prior knowledge of the concept of electricity was problematized through a series of VISTA videos (Pearson, Inc, 2008). These two videos emphasize common misconceptions held by students about the concepts of interest. After the participants watched the videos, they were prompted to compare their previously–held understanding of the concepts of interest to what they had just watched. Participants were then asked to discuss their learning experiences pertinent to these concepts in pairs. After the group discussions, we engaged the participants in hands-on and minds-on learning experiences, in an effort to help them develop scientifically accurate understanding about the concepts of interest. For instance, students built simple circuits, series and parallel circuits. A discussion about how to teach the concepts of interest followed after the participants' completion of the hands-on activities. The hands-on learning activities on electricity engaged participants in building simple, series and parallel circuits using the Electric KitBook (Edamar, 2008). The hands-on learning activity on the phases of moon involved the following. Participants used a Styrofoam ball to represent the Moon, their bodies to represent the earth and a light source to represent the Sun. The Styrofoam ball was lit by a light source (overhead projector). This enabled the participants to observe how different portions of the ball are illuminated as they rotated on their axis counter clockwise. Then, participants created a complete series of

phases matching the appearance of the Moon and related the moon phases to the positions of Earth and the Sun. Participants learned about the seasons by a simulation activity that enabled them to see how the sun rays (flashlight) hit the surfaces of a Globe model at different angles. They were then asked to represent their understanding of different seasons through drawing models. In addition, participants were asked to compare their models with one another and engage in discussions.

After participants completed the hands-on learning activities, we asked them to take a critical look at how the students they watched in the videos might have developed misconceptions about the scientific phenomena of interest. Finally, participants engaged in a collective discussion that focused on their pre-conceptions and those of the students shown in the videos.

Findings

We present the pre and post test data in percentages for each of the science concepts tested in Table 1. Figure A visually documents the growth in participants' conceptual understanding of lunar phases, seasonal changes and simple electric circuits.

Table 1. *Pre and Post Test Percentages of Correct Responses*

Concept	Pre-Test Percent Correct	Post Test Percent Correct	Difference
Lunar Phases	27.50	95.00	68.50
Seasonal Changes	43.50	98.00	54.50
Simple Circuit: One Battery	37.50	100.00	63.50
Simple Circuit: Two Batteries	10.00	98.25	88.25

Analyses of the pre-test scores revealed that participants' conceptions of lunar phases, seasonal changes and simple electric circuits were not consistent with the scientifically correct ones as shown in Table 1. While only 27.5 % of the participants (n = 11) accurately answered the question about the lunar phases, 43.5 % of them (n = 17) answered the question about the seasonal changes correctly. Participants scored relatively low on the pre-test questions that measured their conceptual understanding of simple electric circuits. More importantly, there was a difference in percentages of participants who correctly answered the simple circuit question with one battery only (37.50% or n = 15) and the simple circuit question with two batteries (10.00% or n = 4). Next, we provide in-depth analyses of participants' responses by highlighting their misconceptions.

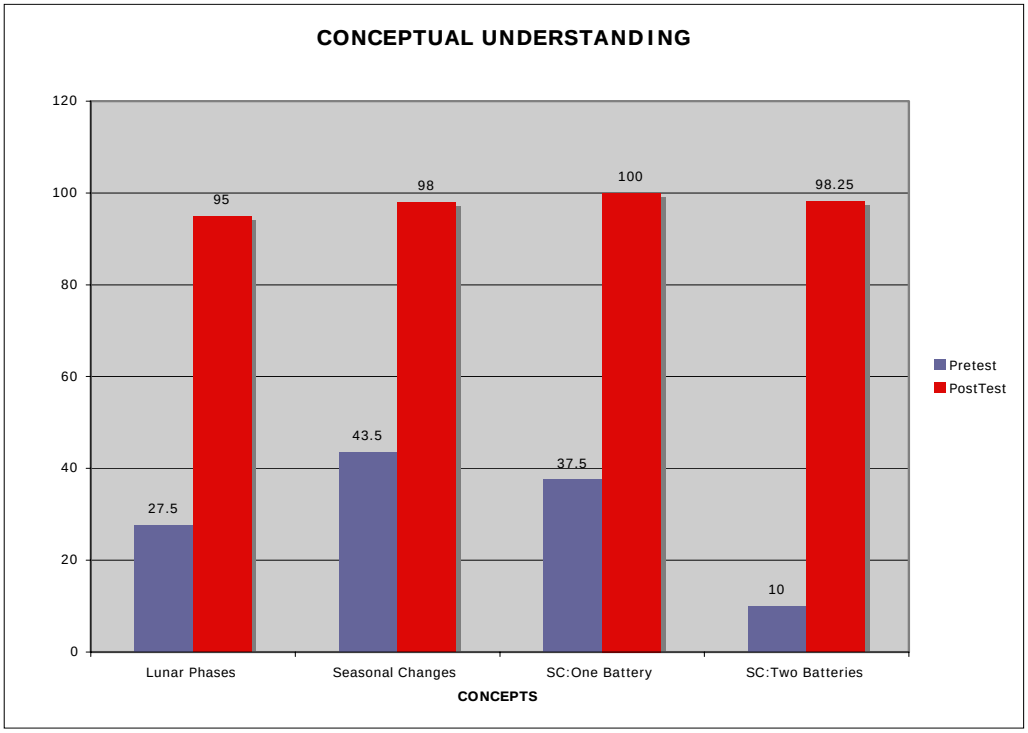

Figure A. Pre and Post Change

Misconceptions about Lunar Phases

Two common misconceptions about lunar phases surfaced when participants' answers to the pre-test were analyzed. First, 27% of the participants (n = 11) failed to accurately locate the Sun, the Moon and the Earth relative to one another. For instance, some participants placed the Sun is in the centre of their models, and the earth and the moon simultaneously rotating around the Sun. The second dealt with how participants conceptualized the ways in which the sun's rays reached the surface of the moon. Although the participants were able to show that there are eight different phases of the moon, they failed to accurately show how the sun reached the surface of the moon in each phase. For instance, the analysis of students' drawing of the lunar phases shows that they failed to differentiate between the way in which the sun' rays hit the surface of the moon during waxing crescent and waning crescent. It follows that in order for pre-service elementary teachers to develop conceptual understanding; they should be explicitly shown that the reasons why we see the moon in different shapes at different days of the month are because of the sun's reflection on the moon and the revolution of the moon around the Earth. Moreover, they should be challenged through reflective learning experiences to develop an understanding about how the sun's rays reach the surface of the moon in each phase.

Misconceptions about Simple Electrical Circuits

The questions about simple electric circuits asked the participants to show the direction of flow in the simple circuit built with one battery, enough wiring and a light bulb and in the simple circuit built with two batteries, enough wiring and a light bulb (see Appendix A). Four essential misconceptions emerged from the analysis of participants' circuit drawings. These misconceptions include: (1) the direction of flow is not of significant importance in the design of simple electrical circuits, (2) a battery holds a certain amount of stored energy that starts to flow once connected to a wire; so, it does not matter which end of the battery is connected to the wire, (3) electricity flows from the battery to the bulb and is consumed there, and (4) the flow of electricity is bidirectional when the two batteries are used to build a simple electric circuit. Tables 2 and 3 provide a description of participants' misconceptions in both cases.

Table 2. *Pre-service Elementary Teachers' Conceptions of a Simple Circuit: 1 Battery*

Misconceptions	Description	#Of responses
Case 1	No direction of flow Wire is attached to the positive end One directional	15
Case 2	No direction of flow Wire is attached to the negative end	1
Case 3	No direction of flow Wire is attached to the positive end and to the glass part of the bulb	1
Case 4	Positive or negative not indicated No direction of flow One directional Positive and negative end connected but flow is from the positive end Two wires go from the positive end to the battery	7 1
Correct case	Scientifically correct drawings (i.e. applies the principles of closed circuits).	15

As the data indicate, the majority of the participants (n=26) failed to accurately design a simple electrical circuit with one battery, one bulb and enough wiring.

Table 3. *Pre-service Elementary Teachers' Conceptions of a Simple Circuit: 2 Batteries*

Misconceptions	Description	#Of responses
Case 1	Bulb in the middle electricity flowing to the bulb from the positive end of both batteries but after the electricity reaches the bulb it travels back using the same bath it used to reach the bulb.	2
Case 2	Closed circuit but electricity is flowing from the positive end and completing the entire circuit.	2
Case 3	Bulb in the middle electricity flowing to the bulb from the positive end of both batteries but the electricity travels back and forth and the two negative ends of batteries are connected with an external wire.	1
Case 4	Bulb in the middle but electricity is flowing to the bulb from both the negative and the positive end of both batteries to the bulb from the opposite directions.	1
Case 5	Two Batteries are externally attached to the bulb from the same side, the triangle wires connect each battery to the bulb, the flow is one directional in both batteries.	2
Case 6	Bulb in the middle each battery is on the opposite side of the bulb the flow is from the negative end of battery one, pass through the bulb and reaches the positive end of battery 2. The other one is from positive end of batter 1 to the positive end of battery 2.	2
Case 7	Bulb in the middle but electricity is flowing to the bulb from both the positive end of each battery and they reach the bulb and end there. In two cases positive end of the batteries connect first	11
Case 8	Closed circuit with two batteries connected to on another. The flow is from the positive end of the second battery and the flow stops after it reaches the bulb.	1

Misconceptions	Description	#Of responses
Case 9	Closed circuit with two batteries connected to on another. The flow is from the positive end of the second battery and the flow continues.	1
Case 10	Closed circuit with two batteries connected to one another. The flow is from the negative end of battery one to the positive end of battery. Then the flow is from negative end of battery 2 through the bulb and reaches the positive end of battery 1.	1
Case 11	Two batteries are connected positive end of battery 2 and the negative end of battery one connects. After they connect the electricity reaches the bulb the flow is one directional.	1
Case 12	Two batteries are connected positive end of battery 2 and the negative end of battery 1 connects and the other end reaches the bulb the flow is one directional.	3
	Bulb in the middle but electricity is flowing from the bulb to the positive end of batteries on the opposite side.	5
Case 13	Two batteries are independent not connected to one another but to the bulb at the same time. The electricity flows from positive end of battery 1 to the negative end of battery 2.	2
Case 14	Two batteries are independent not connected to one another but to the bulb at the same time. The electricity flows from negative end of battery 1, through the bulb and to the negative end of battery 2.	1
Case 15	Closed circuit flow is from the positive end of battery 1 to the negative end of battery 2.	
Correct Case	Correct answer (i.e. applies the principles of a closed circuit)	4

The analysis of participants' responses illustrated in drawings (see Appendix B) suggests that participants did not know how the current is produced, or the fundamental scientific principles that cause the electricity to flow from the battery to the bulb. Six different patterns emerged from

participants' incorrect responses to the first electricity question that asked them to build a simple circuit using only one battery and one bulb.

Fifteen patterns were identified in students' incorrect responses to the question that asked them to build a simple electric circuit using two batteries and one bulb. The analysis of data from the drawings of a simple circuit with two batteries indicates that the participants did not understand the scientific principle that guides the movement of electrons in a simple circuit. More than half of them failed to correctly draw a simple circuit when challenged to draw a simple circuit by using one battery, enough wiring and one bulb. In addition, 74% of those who correctly drew a simple circuit with one battery failed to draw a simple circuit with two batteries.

Misconceptions about Seasonal Changes

Pre-service elementary school teachers' misconceptions about seasonal changes were identified through a qualitative analysis of students' drawings. Although most participants (n = 34) had a general understanding that the seasons were caused by the tilt of the earth, a small number (n = 6) failed to acknowledge the tilt of the earth as a factor for the seasons. Those who were able to provide a correct answer acknowledged that solstices and equinoxes mark the points at which the poles are tilted at their maximum toward or away from the sun (see Appendix). However, the majority of the participants (n = 32) failed to acknowledge that the sun's glancing rays are spread over a greater surface area and must travel through more of the atmosphere before reaching the earth in their drawings or explanations. Although participants acknowledged that the sun is the source of light, energy and heat, they failed to acknowledge that the changing intensity and concentration of its rays gave rise to the seasons of winter, spring, summer and the fall. Instead, they mentioned that seasons took place because of the earth's tilt in simple terms. Such naïve understanding of content may not be sufficient for pre-service teachers to design effective science instruction in their classrooms.

Discussion

The findings highlight that the majority of pre-service elementary school teachers in this study came to the science methods course with scientifically inaccurate conceptions about lunar phases, seasonal changes and simple electrical circuits. As shown in this study, although the majority of the participants were able to show eight different phases of the moon in their drawings, they failed to understand the causes of the changes in the shape of the moon. Two things can account for this finding. Either these concepts were not covered in these teachers' science content courses or it may be that the participants failed to develop conceptual understanding because of learning science through an authoritarian rather than a constructivist learning environment. For instance, instead of challenging students to construct understanding about a particular scientific phenomenon, students are often asked to accept the knowledge presented by the teacher as truth

(Tobin et al., 1994). Such learning experiences limit students' ability to explain the scientific phenomena. If the students are not given the opportunity to construct knowledge on their own through the support and challenge provided by the members of the learning community in which they are a part, their conceptual understanding of scientific concepts may be limited.

As the growth of participants' conceptual understanding between pre and post tests indicates, when learning activities are informed by a social constructivist epistemology and learning experiences are situated in a context that best approximates he context in which such knowledge will be used, students have better chances of developing conceptual understanding of key scientific ideas. This finding is consistent with previous studies that indicate that the science courses specifically designed for pre-service elementary teachers have a greater impact on their learning than the traditional science courses taught in the college of arts and sciences do (Schoon & Boone, 1998). Learning activities informed by social constructivism provides a context for the discrepancies in students' understanding to come to fore as it challenges the learner to make his/her understanding visible (Rogoff, 1990). By the same token, the challenge and further understanding provided by the other members of a learning community (i.e. peers and the instructor) can help students to solve the discrepancies in their understanding and thus achieve conceptual understanding. Both the challenge and support provided by the other members of the community stimulates the process of knowledge reconstruction (Rogoff, 1990; Roschelle, 1992; Vosniadou, 2007).

In addition to the structure of the learning activities, the context in which the learning took place may have accounted for some of the reported improvements in participants' conceptual understanding. Consistent with the assumptions of situated learning, the participations learned the science content in a context that allowed them to become familiar with the challenges that elementary school students have in their learning of science content and discuss ways to help the students to overcome those challenges. This situated perspective on learning might have facilitated the process of conceptual change among the participants. These findings are also consistent with socio-cultural views of conceptual change literature (Hatano, & Inagaki, 2003). The participants discussed the misconceptions that they had, the ways in which they learned concepts themselves and elaborated on ways to teach them.

Implications

This study has significant implications for pre-service elementary teacher education. First, it highlights the prevalence of misconceptions pre-service elementary teachers hold about fundamental science concepts that are central to their practice. These misconceptions must be explored and addressed in their science methods courses. Exploring and addressing such

misconceptions among pre-service elementary school teachers is significant in that they impact their students' learning (Stahly, Krockover, & Shepardson, 1999; Trundle et al, 2007). Second, it demonstrates that assessment methods that require students to explain their understanding are more powerful for exploring students' misconceptions than the traditional assessments that simply ask students to simply choose an answer among several choices. Finally, it suggests that reflective learning activities informed by the epistemologies of social constructivism and the situated learning model are promising in helping pre-service elementary teachers to experience conceptual change and thus develop scientifically accurate conceptions about simple electric circuits and lunar phases. These types of reflective learning opportunities must become essential component of pre-service elementary science instruction.

Understanding the types and nature of pre-service elementary teachers' misconceptions related to fundamental science concepts is critical. Such understanding will enable science teacher educators to design responsive instruction and thus address the learning needs of pre-service elementary teachers related to science. Making pre-service elementary teachers' misconceptions visible and changing them through effective instruction has significant implications for how they may teach these science concepts once they become classroom teachers. The link between elementary teachers' enhanced content knowledge and their students' conceptual understanding of essential science concepts needs to be substantiated through empirical studies. Establishing such link is important simply because pre-service elementary teachers' conceptual understanding of essential science concepts gained in a science methods course may not be durable. Further studies should explore the durability of conceptual understanding gained through reflective conceptual change strategies such as the one modelled in this study.

Limitations

Although this study brings an important aspect of elementary school teachers' knowledge base for teaching science to science educators' attention, it has certain limitations as well. The main limitation of this study is that we did not record the conversations that took place between the pre-service elementary teachers when they engaged in lengthy discussions about the source of their misconceptions and ways of teaching science for the purpose of triggering conceptual change. Such data would have been invaluable for understanding the source of students' misconceptions and the misconceptions that they may hold about teaching science to young children.

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Mehmet Aydeniz, Ph.D. is an Assistant Professor of Science Education at The University of Tennessee, U.S. His research interests include assessment of student learning in science, chemistry education, inquiry-based learning and teacher effectiveness.

Clara Lee Brown, Ph.D. is an Associate Professor of ESL Education at The University of Tennessee, U.S. Her research interests include enhancing ELLs' academic language proficiency through content area learning and equity issues in large-scale statewide testing programs.

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APPENDIX A

PART A. Phases of The Moon:

1. Draw the phases of the moon in relation to the Sun and the Earth.
   The following directions were verbally provided.
   a. In your drawing, indicate the relative location of the earth, moon and the sun.
   b. In your drawing, indicate the direction in which the moon rotates.
   c. In your drawing, indicate the part of the moon that is lit and the part that is dark.

PART B. Electricity

1. Simple Circuit

   a. Draw a simple electrical circuit using a battery, a wire and a light bulb. In your drawings show the source and direction of the flow of electricity. *Verbal directions*: Label parts of the circuit with appropriate names.

2. Simple Circuit:

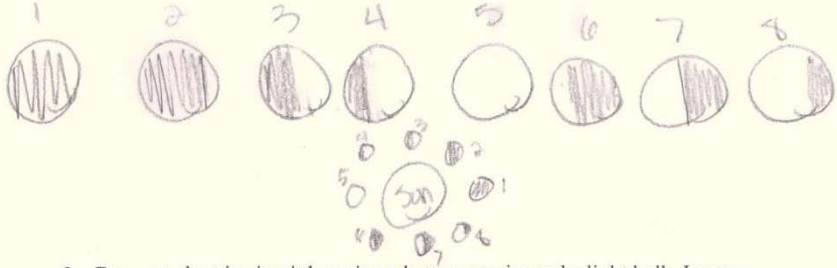
   a. Draw a simple electrical circuit with two Batteries, two wires and one light bulb. *Verbal directions*: Label parts of the circuit with appropriate names.

PART C. Seasons

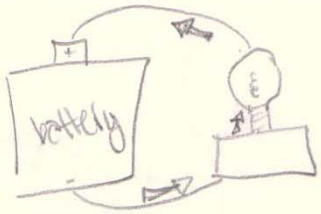
1. Explain why we have seasons, days and nights. You can use drawings to communicate your understanding. Draw the model and explain why you think it works that way.

Appendix B. Students' Drawings

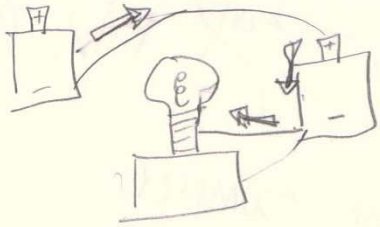
1. Draw phases of the Moon in relation to the Sun and the Earth. (earth/space)



2. Draw an electric circuit by using a battery, a wire and a light bulb. In your drawings show the source and the direction of the flow of electricity.



3. Draw an electric circuit with two batteries, two wires and one light bulb. In your drawings show the source and the direction of the flow of electricity.



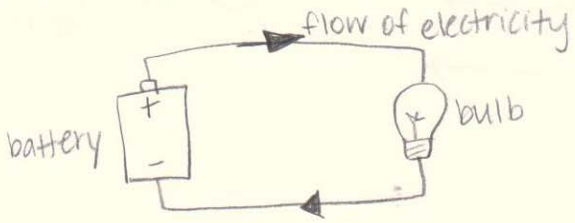
4. Explain why we have seasons, days and nights. You can use drawings to communicate your understanding. Draw the model, explain why you think it works that way?

We have seasons & days & nights because the earth's axis is tilted at 23.5 degrees. As the earth's axis tilts away from the sun it's winter & when the earth's axis tilts toward the sun it's summer (the inbetween degrees are spring & fall). drawing

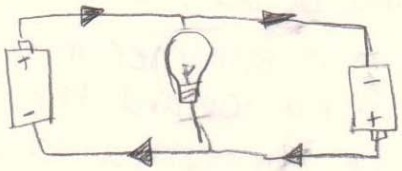
Appendix B. Students' Drawings

1. Draw phases of the Moon in relation to the Sun and the Earth. (earth/space)

2. Draw an electric circuit by using a battery, a wire and a light bulb. In your drawings show the source and the direction of the flow of electricity.



3. Draw an electric circuit with two batteries, two wires and one light bulb. In your drawings show the source and the direction of the flow of electricity.



4. Explain why we have seasons, days and nights. You can use drawings to communicate your understanding. Draw the model, explain why you think it works that way?

There is night and day because the Earth orbits on its axis in a 24 hour period. your location on always be facing towards the sun, so