Part 3

Results of Research-Oriented PEERS Projects

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Chapter 10: The Shared Experiences of International Special Educators

Abstract
Although teaching is often tailored to local contexts, teachers can benefit from collaboration with colleagues in other countries through exposure to innovative ideas and best practices in settings outside their own context. This PEERS collaboration involved three students from the Master's program in special needs education (SNE) at the State of Vaud University of Teacher Education and three students from the Master's program in SNE at the National Institute of Education (NIE) in Singapore. The participants planned and conducted small-scale research studies while being supervised by one professor from each university. In this chapter, the goals and proceedings of international work in special education will be described as well as the outcomes of this specific PEERS project from student and faculty perspectives.

1. Global Education and International Experience

One of the existing challenges for higher education is to internationalize its programs and to make students more globally competent (Childress, 2009; Gacel-Avila, 2005; Rodriguez, 2011). Although teaching is often tailored to local contexts, international collaboration can be important for educators as they grow professionally through exposure to innovative ideas and best practices in other settings. Increased globalization requires

that education leaders establish programs promoting the understanding of global problems and country-specific interventions so that educators around the world can address transnational problems and share solutions (Engstrom & Jones, 2007). Fortunately, the PEERS program recognizes the need to study and to witness education "on the ground" in other contexts and in other countries.

Although much of the existing research on international experiences focuses on general educators, the benefits of teaching and learning abroad are important for all educators. A special educator works with and advocates for students who are often on the fringes of the educational system or left out altogether. Populations of learners who need advocates for social and educational inclusion contain, but are not limited to, students with disabilities, students without access to education due to conflict, and students excluded from educational access because of their gender, religion, ethnicity, or socio-economic status. The individuals who work with marginalized populations can profit greatly from international field experiences and collaboration because the experiences provide learning opportunities that may not be available in their local context.

The participants involved in this PEERS collaboration were all graduate students pursuing their Master's degree in special education. Rhee and Honeycutt Sigler (2010) studied the keys to developing leadership ability in graduate students and emphasized the importance of field experiences as a tool in leadership development. Graduate students learn through comparative educational experiences and are able to develop a more critical eye as they begin to influence both policy and practice (Burke, 2001). Another advantage of collaborative experiences for graduate students in special education is the opportunity to work with colleagues. Friend (2000) reports:

> Virtually every treatise on inclusive practices, whether conceptual, anecdotal, qualitative, or quantitative, concludes that inclusion's success in large part relies on collaboration among staff members and with parents and others, and that failures can typically be traced to shortcomings in the collaborative dimension of the services to students (p. 130).

In other words, students, parents, and the community cannot train teachers as though their profession involved only knowledge, while considering the presence of others as a negligible factor (Loreman, 2010). Involving all stakeholders in the education of students is effective and important in creating an inclusive environment. Positive outcomes for students participating in international experiences include a more focused approached to academic work as well as intellectual and personal growth (Bates, 1997; Carlson & Widaman, 1988; Hadis, 2005; Willard-Holt, 2001).

In addition to the collaborative benefits, the value of international experiences has been explored by researchers across disciplines (e.g., Alfaro & Quezada, 2010; Engstrom & Jones, 2007; Pence & Macgillivray, 2008), and has been found to lead to both personal growth and a professional perspective (Cannon & Arnold, 1998; Knouse & Fontenot, 2008; Narayanan, Olk, & Fukami, 2010; Taylor, 1985, 1988). Active engagement with others from different cultures leads to an expanded worldview and, ultimately, makes one a more flexible and compassionate teacher (Willard-Holt, 2001). As special educators, compassion is central to our profession, and international experiences that are comprehensively planned, carefully delivered, and thoroughly supervised can provide opportunities for this powerful personal and professional growth. International collaborations and experiences help special educators to develop a deeper understanding of inclusive education (Faulconer, 2003; Singal, 2005), greater compassion and flexibility within their practice (Van Hoof & Verbeeten, 2005), and a more self-reflective practice (Darling-Hammond, LaPointe, Meyerson, Orr, & Cohen, 2007). Especially important to special educators may be the understanding that comes from exploring the idea of education as a form of social justice – an idea best understood when experienced. Participants in this PEERS project were exposed to educational systems that were different from their own. In order to understand the differences in special education for the participants better, it was important for them first to understand a brief history of educational policies and practices in both Switzerland and Singapore.

2. Special Needs Education in Switzerland

Switzerland is a federal state composed of 26 provinces. The provinces are responsible for the organization of SNE, as well as general education, which falls under their sole jurisdiction. This leads to a marked heterogeneity in the policies and practices of the provinces, and each one has its own history in the development of SNE. Nevertheless, in Switzerland, SNE has grown at the margin of the general education system, as is the case in most European countries and North America (Armstrong, 2002; Chauvière & Plaisance, 2003). The first special schools in Switzerland were created during the 19th century (European Agency for SNE (EADSNE), 2014). During the 1960s, Federal Invalidity Insurance played a central role in SNE (Swiss Conference of Cantonal Ministers of Education, 2007). Indeed, it financed the education of pupils with disabilities in special schools. However, these measures were provided only to children with intellectual, physical, or sensorial disability, language impairment, and severe behavioral disorder. Children with milder disabilities (learning disabilities and behavioral problems) were schooled in mainstream classrooms, mostly in special classes.

In 2008, a complete reorganization of special education took place. The funding and organizing of SNE for children with disabilities were transferred entirely from Federal Invalidity Insurance to the provinces (Swiss Conference of Cantonal Ministers of Education, 2007). Thus SNE became an integral part of the Swiss education system. Several cantons have entered into an agreement that binds them to promote more inclusive practices, in accordance with the Swiss Federal Act on Equal Rights for People with Disabilities (Swiss Conference of Cantonal Ministers of Education, 2007). This represents a challenge for most of the cantons as Switzerland is one of the most diverse countries in Western Europe (European Agency for Development in SNE (EADSNE), 2010). Currently, some provinces have implemented inclusive education for children with disabilities but others still school most of these students in separate settings. As of 2008, the proportion of pupils schooled in separate settings ranged from 2 % in the province of Tessin to 9 % in the province of Bâle Campagne (Sermier Dessemontet, 2012).

Depending on the province, how SNE is delivered may also be different depending on the students' age. During their very early years, children with disabilities benefit from early childhood intervention. Interventions are mostly family based, with early intervention specialists coming to the child's home (European Agency for Development in SNE [EADSNE], 2014). Beginning in kindergarten, special education is provided either in special schools, special classes, or in general education classrooms, depending on the severity of the pupils' disabilities, and on the degree of inclusion of each province. Generally in Switzerland, there are special schools for pupils with intellectual disability, physical disabilities, severe behavioral disorders, autism spectrum disorder, hearing, and speech or visual impairments. There are also special classes in mainstream schools for pupils with learning disabilities and behavioral problems. These classes have a reduced number of students who often have an adapted or reduced curriculum (European Agency for Development in SNE [EADSNE], 2014). Regarding SNE for pupils included in general education classrooms, teaching and learning consist of a set number of support hours from a special education teacher and therapists during the week, depending on the pupils' needs. When ordinary individual measures available locally from the school's resources are insufficient to meet the children's needs, enhanced individual measures are provided. These measures are characterized by a longer duration, stronger intensity, and more specialized professionals, and are supposed to have a significant impact on pupils' lives (Swiss Conference of Cantonal Ministers of Education, 2007).

3. Special Needs Education in Singapore

As in Switzerland, the Singapore educational system has gone through many changes in the last 50 years as the country has evolved. Initially, education was essentially the provision of basic literacy for the masses. By the early 1980s, Singapore had grown significantly and students of

different abilities and aptitudes were placed in different school settings based on their perceived aptitudes. Schools were separated into two main categories and those categories still exist today. Mainstream schools, focusing on education for typically developing students, fall under the direct purview of the Ministry of Education (MOE). Special schools, for students with varying disabilities, are primarily managed by voluntary welfare organizations (VWO) supported by the National Council of Social Services (NCSS) and MOE.

In 2004, Prime Minister Lee Hsien Loong began to emphasize the need for individuals with disabilities to become a greater part of society (Embassy of the Republic of Singapore: Tokyo, 2004). Several measures were introduced to provide better support for students with SEN studying in mainstream classrooms. These measures included further support for students with special needs across all educational settings, including mainstream schools (Ministry of Education, 2004). Students with mild special needs (including dyslexia, autism spectrum disorders, and attention deficit hyperactivity disorder) could be placed in special schools, and 10 % of existing mainstream teachers are now trained in special needs (TSN) via MOE professional development (MOE, 2017). The shift in focus to inclusive policies also included the creation of allied educators (learning and behavioral support) (AED/LBS) to support the students with mild special needs who had begun studying in mainstream schools. These policies led to an increased awareness about "inclusive education" in Singapore.

These measures may have led to awareness but they did not necessarily lead to the acceptance of individuals with disabilities in the classroom (Walker, 2016). Singaporean schools are still working to find a balance between supporting students with special needs in mainstream schools and placing students with disabilities in special schools. The AED/LBS educators and teachers at special schools are currently trained in different programs at NIE and many mainstream teachers still struggle to accept students with special needs in their classes due to a lack of understanding about how to differentiate instruction and manage behavior (Nonis, 2006). Many mainstream schools have one AED/LBS for hundreds of students, and there are cases where schools do not have

an AED/LBS at all. In these cases, students with special needs receive no extra support from a professional trained in special needs. Unfortunately, in Singapore, special educators can be overworked trying to reach as many students as possible and many students with special needs still end up not receiving services.

4. Description of the SNE PEERS Project

For this particular PEERS project, three students on the Master's program in SNE at the State of Vaud University of Teacher Education (HEP Vaud) and three students of the program in SNE of the National Institute of Education (NIE) in Singapore were selected to participate. The participants involved in this project worked as special education teachers at least 3 days per week in addition to their roles as students. For this collaborative project, participants planned and collaboratively conducted a small-scale research project on a common topic under the supervision of one professor of each university. For the Swiss participants this project was part of the research class of their Master program. For the Singaporean participants this research provided the research foundation for their Master's thesis.

In November 2012, three students of the NIE volunteered to participate in the PEERS project. They were consulted on the topic that interested them for their thesis. Three general topics were identified as their areas of interest: number sense among children with intellectual disability, autism spectrum disorders, and serving students with multiple and severe disabilities. Once these topics were identified, three Swiss students interested in collaborating with a Singaporean partner were identified and recruited.

In December 2012 and January 2013 the participants were paired according to shared research interests, and began corresponding with each other. The participants began communicating via social media and email to become familiar with their areas of personal and professional interest.

The participants were instructed to form a common research question and work on the corresponding literature review. Communication was easy and they began to get to know each other quickly, but choosing a specific topic and research question seemed more difficult. Based on the faculty supervisors' experience teaching research methodologies, this phase takes time and requires scholarly reading. Most students experience several changes of mind during the process. Doing it collaboratively at a distance and in a second language proved to make the process even more complicated. After 2 months of discussion, two of the groups had not yet stabilized their specific topic and could not begin a review of the literature.

In February 2013, the participants from HEP Vaud and their supervisor came to Singapore for a 1-week visit. The week consisted of visits to the schools of their partners, and two work sessions in order to plan their small-scale research. It was required that they specify the research question, research design, and method of data collection. At the end of the working sessions the specific topics of the small case studies were established for the three groups and first drafts of research questions were formulated. The first pair of participants decided to conduct a small-scale research project on number sense among children with intellectual disability (ID) or language impairments. The second group planned to investigate the use of complementary and alternative therapies by parents of children with autism spectrum disorders. The third pair decided to explore the effectiveness of dolphin therapy for children with multiple and severe handicaps. During this week, the participants did not have enough time to plan their research design and method of data collection. However, working sessions during the visit seemed to enable a more effective collaboration online during the following weeks. Participants exchanged literature via email and planned their research design and data collection method. The participants were able to specify the details of the study through communication that took place in March and April of 2013.

In May 2013, the participants collected data for their study. In the first project, standardized mathematical tests were conducted with children with ID by the Singaporean participant and with children with

language impairments by the Swiss participant. In the second project, a survey on the use of complementary and alternative therapies was administered to parents of children with autism spectrum disorders schooled in special schools. In the third project, the Singaporean participant collected data on the sensorial profile of children with multiple and severe handicaps, and videotaped a dolphin therapy session with them while his Swiss counterpart helped to review literature and provide feedback.

In June 2013, the participants from the NIE and their supervisor visited the participants of the HEP-Vaud for 1 week. The visit consisted of visits to special schools and two work sessions. By the time this visit took place, participants had completed data collection. They had afternoon working sessions so they could work on the analysis of the collected data and on the presentation of their results.

During August and September 2013 the participants continued to analyze their data, draft their study results, and collaborate on reflections about the research process. Participants were instructed to submit a completed 15-page draft of their final manuscript for review. During October of 2013, the faculty supervisors involved in the project reviewed the research papers and provided feedback. In November 2013, participants submitted their final version of a 15-page research paper as well as a 2–3-page reflective paper.

5. Full Reflections

The reflections of the participants provided insight into their experiences in the PEERS project. Both the Swiss and the Singaporean participants found the collaboration extremely valuable and useful for their personal and professional growth. Especially important from the participants' perspective was the growth they experienced in three distinct ways: understanding scientific research, personal reflections on cultural norms, and professional understanding during school visits.

5.1 Scientific Research

The quality of the research reports written by the participants involved in this PEERS collaboration indicates that they attained the goals set for their program. The faculty mentors concluded that participating in this project was an appropriate alternative to a typical graduate class on research. Involvement in the PEERS project provided an effective initiation into the research process for the Swiss participants while allowing the Singaporean participants to put their research skills into practice. Indeed, they worked together to complete a systematic search of literature, to write a synthetic but comprehensive review of the literature, to formulate precise research questions, to select an appropriate research design and method of data collection, and to analyze their results. It is important to note that the faculty supervisors supported the participants in each of these steps, as if the participants were in the actual research class. The professor systematically gave them formative feedback on the output of each step. Participants indicated that they found the process valuable.

> *"Participation was a scientifically rich experience" – Isabelle, Manon, and Katya, Switzerland.*
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> *"The research has given me the chance to look deeper into the area of numeracy and children with special needs from a different cultural context" – Janice, Singapore.*

Although there were differences in the type of interventions and equipment available in Singapore and Switzerland, the exposure to different treatments opened the eyes of the participants to interventions of which they were not aware prior to the collaboration. In the project on the effects of dolphin therapy it was impossible for the Swiss student to collect data as dolphin therapy was not being used either in her professional context, or anywhere else in Switzerland. Despite this, she was taken in by the novelty of the topic and her Singaporean counterpart found her questioning important for his own clarification.

> *"I was very interested in the topic, because I would never have had the opportunity to work on it without this partnership with the NIE" – Manon, Switzerland*

> *"We approached the topic from each other's perspectives. By doing this, there were certain points that I never thought of and that gave me better understanding and clarity about the research topic" – Izad, Singapore*

5.2 Culture

While cultural myopia, in itself, is rarely intentional, in order for all educators to avoid seeing things through an ethnocentric lens it is important to make a deliberate effort to engage in international experiences. The participants from both Singapore and Switzerland recognized the value in the international collaboration as it helped to shine a light on their own cultural norms as well as those of their partners.

> *"We liked to discover the richness of the different cultures in Singapore […] In this project we collaborated with persons from each of the three majority cultural groups […] confronted with the different cultures, we learned to respect different social codes, for example not looking at some men in the eye when talking, or not refusing a proposition too directly" – Isabelle, Manon, and Katya, Switzerland.*

These lessons are particularly important because educational inequities towards children from foreign nationalities are an issue in the Swiss educational system (Swiss Center for the Coordination of Educational Research, 2010). Unfortunately, students from foreign nationalities are overrepresented in special education classes (Lischer, 2007), as is the case in several countries (Zhang & Katsiyannis, 2002). Not seeing cultural differences, or assuming that education is culturally neutral, is problematic when teaching students with culturally diverse backgrounds because it can lead special education teachers to see deficits or inappropriate behaviors rather than differences (Gay, 2002). Being conscious that European-American middle-class cultural codes or values are a variant and not a universal norm, is one of the important aspects of culturally responsive teaching (Gay, 2002). However, the value of the collaboration did not just affect the Swiss participants. The Singaporean participants were also stretched by the cultural differences.

> *"The collaboration widened my perspectives on the research topic and special education in general by interacting and collaborating with someone from a different culture and educational system. This project gave me the opportunity to learn about things that are beyond academic publications and it has definitely been a rewarding experience" – Janice, Singapore*

5.3 Schools

Although the visits were short, participants still found that touring schools in their colleagues' country had an impact. During the school visits in Singapore, the participants could see for themselves that the trend towards inclusion is not restricted to Switzerland but is an international trend that is also important in Singapore. They could witness interesting practices at the school and professional level.

> *"This collaboration allowed us to open our eyes on what is done in other countries in the world in education and pedagogy for children with special educational needs. Sometimes we admired the equipment and means used in the special schools we visited and it inspired us for our professional practice " – Isabelle, Manon, and Katya, Switzerland*
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> *"I was impressed by the projects developed to include children and adults with special needs in schools and in the community" – Isabelle, Switzerland*
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> "*I was surprised to see the importance given to including pupils with special needs in the school I visited" – Katya, Switzerland*

The Singaporean students also found it important that they actually saw at first hand the similarities and differences instead of only reading about them in a journal article or hearing about them in a class lecture. As Singapore is a small island, the opportunities to visit schools in different countries is limited as is collaboration with international colleagues.

> *"The insights that I had were truly enlightening and made me feel that there was so much out there in the world, with new things to learn for my development as an individual and as an educator […] my partner and I were eager to share about the school we are teaching in and the students that we teach. The beautiful part about our conversations was that we were always very amazed by what each other has been doing in school and that increased our curiosity and eagerness to visit*

> *one another's work environment to really experience what had been shared. It has given me the chance to not only make comparisons but also learn from the different education/welfare system of Singapore and Switzerland better in the area of special needs. Often, we read journal articles of how the education system of a certain country is without truly understanding it. Thus, the visit to the three schools was an extremely enriching experience as it was experiential and it gave me an idea of what the Swiss education system is like" – Izad, Singapore.*

5.4 Challenges

There were, of course, various challenges in conducting collaborative small-scale research studies in two different countries. The first relates to the official directive of the State of Vaud that forbids participants from the University of Teacher Education from collecting data on pupils out of their current professional context. This was a major hindrance in the collaborative planning and conduct of the study. For the Singaporean participants, receiving authorization to collect data outside their professional context was also difficult. The participants all collected data at the schools where they worked. In the project on number sense it prevented the Swiss and Singaporean participants from using the same instruments and comparing their results

> *"My professional context did not allow me to align myself on my partner's method. My pupils were younger and had a different diagnosis" – Isabelle, Switzerland*

Although the Swiss participants progressed greatly throughout the project and viewed the reliance on English as a benefit, their initial level of proficiency in English was a hindrance to efficient communication on research in the beginning. Progressively, they made significant progress acquiring the scientific lexicon in our field. Being able to read and understand English articles is important in research because the best scientific journals in the field of special education are published in English. Reading and writing in English will be a useful skill for the participants when they complete the literature review for their thesis. Moreover, mastering English is also strength for Swiss special education teachers. In the French-speaking provinces of Switzerland, English has

recently become part of the curriculum from primary level. Although language was a barrier in certain cases, the Swiss participants also found participation in the PEERS project a benefit to their own improvement in the English language compared to taking a traditional research class.

> *"Thanks to the participation in this project, we were able to improve our level in English. Indeed, we trained it by communicating with our partners, but also by reading scientific articles in English" – Isabelle, Manon, and Katya, Switzerland.*

However, the Swiss students' level of writing did not progress enough for them to write their research reports collaboratively with their partners in English, as was initially planned. The Singaporean participants wrote their reports in English, and the Swiss participants in French. This prevented a final common presentation and discussion of the results by all the participants in the PEERS project, which is regrettable.

6. Conclusions

Gacel-Avila (2005) states:

> One of the basic and fundamental functions of a university should be the fostering of global consciousness among students, to make them understand the relation of interdependence between people and societies, to develop in students an understanding of their own and other cultures and respect for pluralism (p. 123).

The State of Vaud University of Teacher Education is "*aware of the impact of national and international projects on the quality of training, as well as on professional practice, the University of Teacher Education has a dynamic politics of collaboration and exchange […] It therefore develops relations with several partners in education in Switzerland and in the world*" (Haute Ecole Pédagogique, 2014). The NIE in Singapore "*endeavors to pursue tie-ups with reputable international educational and commercial organizations with the objective of cultivating mutually beneficial partnerships. Through memoranda of understanding and*

agreements, the Institute's network of collaborations spans the globe. The linkages with our valued partners create a great many opportunities for dynamic and fruitful exchanges of knowledge and collaborative teaching and research activities, which ultimately contributes to raising the quality of teacher education" (National Institute of Education, 2017).

As both universities clearly support and promote international collaborations, this project focusing on special educators was a priority. Both universities realize that experiencing, reflecting and learning should not be confined within one building or one campus (Phillion, Malewski, Sharma, & Wang, 2009). It is important that special educators at every level take advantage of opportunities to learn and grow personally and professionally in international environments. Participants should not only understand policy and practice in their own settings but also appreciate how other areas of education are affected by global policy in an increasingly interdependent world. Although challenges do exist, international collaboration and research projects can provide a perspective that is invaluable as we advocate and work on behalf of all learners. Although the research itself was important, participants and supervisors agreed that the biggest benefit of the program was the collaboration between cultures.

The ability to see schools and approaches differently was extremely valuable if not exactly quantifiable. There are lessons to be learned through these collaborations, which stimulate curiosity and allow for innovative practice within local contexts. Although the research projects were important for comparative purposes, the sharing of ideas and possibilities for SNE was even more beneficial.

The PEERS project is an example of one partnership that directly benefits the participants and students with special needs in Switzerland and Singapore. Programs like the PEERS project insure that our students studying special education have the opportunity to continue to grow both personally and professionally. When participants bring this knowledge back to their colleagues and into their classrooms, the benefits of a program like this become exponential for the participants, the students, and the communities they serve.

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Chapter 11: Football, Dance, Dolls and Toy Cars: Comparative Analysis Between Switzerland and Spain in Relation to Gender Stereotypes Among Primary School Pupils

Abstract
Carried out in the context of a PEERS project between Lausanne and Barcelona, the aim of this study was to compare the place of gender stereotypes among young pupils educated in Swiss and Spanish schools. These stereotypes were measured in relation to sporting activities (football and dance) and in relation to toys (dolls and toy cars). Questionnaires were distributed to the pupils of both countries (n = 120) and focus groups were set up (n = 9). The results show that a large majority of pupils adhere to gender stereotypes and that they separate activities into two categories: male (football and toy cars) and female (dance and dolls). Some differences emerge between the two countries, the Spanish pupils adhering to gender stereotypes in a more pronounced way than the Swiss. At school, action against stereotypes should be developed to allow each and every pupil to engage freely and confidently in all activities.

1. Introduction

At an international level, the issue of gender in school has become a "crucial topic" (Eurydice Report, 2010, p. 3), particularly in light of persistent inequalities between girls and boys in schools. This chapter looks at the role of gender stereotypes in young pupils enrolled at primary level. Stereotypes play a role in gender socialization and in the construction of the gender identity of the male and female citizen of tomorrow. The study conducted here looks at gender stereotypes in sport and physical activities and with regard to toys, two main vectors of gender socialization (Dafflon-Novelle, 2006; Rouyer, Mieyaa & Le Blanc, 2014). Developed within the framework of a PEERS project between Lausanne (University of Teacher Education of State of Vaud) and Barcelona (Universitat Ramon Llull) (Bréau, 2015, 2016), an international comparison was performed between Switzerland and Spain, two countries seeking to promote gender equality in school and more broadly in society (Baena-Extremera & Ruiz-Montero, 2009; Chaponnière, 2011).

2. Gender Socialization, a Complex Process

Throughout life, each individual is required to internalize social norms and codes relating to the masculine and feminine. Gradually, everyone learns to navigate in a "gendered" world, a binary world where a difference is made between masculinity and femininity, men and women, boys and girls (Butler, 2004). Gender socialization refers to learning "gender roles," different and stereotypical roles (Bereni & al., 2008). Some behavior patterns, gestures or ways of expressing emotions will thus be privileged or rejected depending on the child's gender. The dissemination of gender norms and the construction of "stereotypical roles" takes place mainly through various socializing agents such as family, school,

peer groups, or the media (Hyde & Jaffee, 2000). The family is the first place in which children experience a gender difference (Corsaro, 2005; Rouyer & Zaouche-Gaudron, 2006). Very quickly, parents will create a specific environment for each gender, whether in terms of clothes, decoration or toys for their children. Girls and boys are raised in a differentiated manner, consistent with gender stereotypes, especially in the first years of life (McHale, Crouter & Whiteman, 2003). Within the school, different treatment appears early. Girls learn to be better organized, more attentive in class, and more respectful of school rules than boys (Van de Gaer & al., 2006). Adherence to gender stereotypes thus tends to become stronger in school (Bréau & Lentillon-Kaestner, 2016; De Boissieu, 2009; Zaidman, 1996).

3. The Construction of the Gender Identity of the Child: Some Developmental Landmarks

Gender identity is understood as the feeling of belonging to one gender and the sense of our masculinity and our femininity (Chiland, 2003). The construction of gender identity takes place in a longitudinal perspective (Leaper & Friedman, 2006) and refers to the different stages through which a child will pass to build their identity as a boy or as a girl within their culture (Le Maner-Idrissi, 1997). Gender, along with age, is one of the first two social categories used by children to understand the world around them (Bem, 1981). Thus, even when only a few months old, babies are able to distinguish between individuals of different genders. Children then go on to access knowledge of gendered roles and objects (Ruble & Martin, 1998). Gradually every child, boy, and girl organizes their environment on the basis of the "masculine/feminine" dichotomy and develops a kind of gender diagram (Le Maner-Idrissi & Renault, 2006). As far as the evolution of knowledge on gender and on gender roles is concerned, some cognitive theories stress the presence of different stages during childhood (Kohlberg, 1966; Martin & Halverson,

1981). From the age of five, children enter the stage of "gender stability." Children perceive compliance with gendered roles as "morally right" (Mieyaa & Rouyer, 2010, p. 4) and will tend to show a certain rigidity in their behavior and their representations. During this stage, children feel that violations of gender roles are unacceptable. The tendency to play with gender-typed toys and gendered segregation in games between peers continues to increase during this period (Maccoby, 1990). Around the age of seven, the child will enter the so-called "gender constancy" stage. They understand that the gender of an individual is a biological given, and that membership of a gender group remains stable beyond time and situations. Some children may well begin to question the validity of gender roles, and gradually withdraw from certain gender standards and a "morally right" compliance (Golombok & Fivush, 1994). In this regard, it is important not to reduce the construction of gender identity to a mere social construction. Children do not simply internalize gender stereotypes or other gender roles at a cognitive level with varying degrees of passivity; they use and modify them to suit their personal stories. It is thus a construction in which the subject is actively involved (Owen Blakemore, Berenbaum & Liben, 2009; Rouyer & Zaouche-Gaudron, 2006). The construction of gender identity is thus divided between a process of acculturation and a process of personalization (Malrieu, 2003). It is therefore necessary to analyze the construction of gender identity within an integrative perspective that takes into account sociological, cognitive, but also affective elements (Rouyer, 2007).

4. Gender Stereotypes

In general, stereotypes refer to a set of rigid or even caricatural beliefs about certain characteristics of a social group. When it comes to men and women, from birth we learn and access different gender stereotypes (e.g., a boy does not cry, pink is for girls), defined as a range "*of signals that combine character traits, skills, attitudes to one gender over another*

and that shape our view of the place and role of men and women in our society" (Costes, Houadec & Lizan, 2008, p. 59). Gender stereotypes contribute to the construction of a binary, sexed and differentiated world. At school, some school subjects are considered more suited to boys or to girls. The teachers' efforts to stimulate their pupils and their expectations of success rest unconsciously on these stereotypes (Duru-Bellat, 2011). Gender stereotypes become a brake for the academic success of the pupils, their sense of competence, or their taste for certain activities or school subjects (Bouchard & Saint-Amant, 1996). Finally, they represent real obstacles to individual choices, for both men and women, and contribute to the persistence of gender inequalities (Bréau & Lentillon-Kaestner, 2016).

4.1 Gender Stereotypes in Sport and Physical Activity

Sport is often described as the "stronghold of masculinity" (Elias & Dunning, 1994) and many gender stereotypes are still prevalent (Hively & El Alayli, 2014; Knight & Giuliano, 2001). Because of its history and its representations, sport is seen as a thoroughly masculine activity (Hargreaves, 1994). It contributes to the formation and reproduction of a dualist definition of the feminine and masculine physique, where girls are considered to be weaker than boys (Lentillon, 2009). Depending on their intrinsic characteristics, the different physical activities and sports are the subject of a sexual marking (Fontayne, Sarrazin & Famose, 2001). Male sports (football, boxing, rugby, martial arts) tend to involve features such as physical contact, opposition, and strength, whereas women's sports (dance, gymnastics, aerobics) entail more expression, grace, and aesthetics (Hardin & Greer, 2009). Indeed, there is no doubt about the feminine credentials of dance and gymnastics in the minds of young pupils (Dowling Naess, 2001; Gorely, Holroyd & Kirk, 2003). Other activities such as badminton or swimming are considered neutral, as suitable for both sexes. At school, physical education and sports classes (PE) seem to perpetuate this stereotyping and division between the masculine and the feminine (Fagrell, Larsson & Redelius, 2012). While teachers tend

to turn more to boys to perform demonstrations, studies also point to the continued use of stereotyped expressions that can ridicule the pupils, especially girls (Castillo, 2009; Rønholt, 2002). In Spain, activities that combine strength, speed, and endurance are primarily offered to boys while girls take part in coordination activities (Valdivia & al., 2010). As regards the role of the family, parents tend to encourage boys to engage in physical activities and see them as being significantly more proficient at sports than girls (Bois & Sarrazin, 2006; Fredericks & Eccles, 2005).

4.2 Gender Stereotypes in Relation to Toys

During the first years of life, toys are one of the main vectors of gender socialization, in particular through the transmission of stereotypes (Fisher, 2006; Rouyer & Robert, 2010). They thus contribute to the construction of a child's gender identity and towards the separation between masculinity and femininity. Early on, differences emerge in the behavior of girls and boys, especially in the choice of toys (Cherney, Harper & Winter, 2006; Le Maner-Idrissi & Renault, 2006). Cars, boats, and flying objects become specific to boys as the girls continue to play with dolls and dolls' tea sets (Zegai, 2010). A real separation of the genders in the toy universe is thus present and tends to become stronger and stronger. Girls, however, seem to have more freedom than boys, and can more easily play games with the opposite sex. For boys, liking feminine activities seems to cast doubt on their sexual preferences. Some find themselves quickly "snatched away" from the dolls' house (Collet, 2011).

4.3 Gender Stereotypes in Young Swiss and Spanish Pupils: What Do They Have to Say?

Today, few studies have considered the views of young pupils when it comes to gender stereotypes (Rouyer & Robert, 2010). Yet hearing what the child has to say is an innovative and relevant investigative

approach from both a theoretical and methodological viewpoint (Mieyaa, Rouyer & Le Blanc, 2010). Focus groups are a particularly effective tool to explore the views of young children (Morgan & al., 2002). The study proposed here has focused solely on the views of young boys and girls about different gender stereotypes in relation to sports and toys. The implementation of this research project was based on a PEERS project, bringing together for one academic year students and teacher-researchers from both countries (Bréau, 2015, 2016). An international comparison was conducted between Switzerland and Spain, two countries eager to strengthen gender equality in schools. In Switzerland, some inequalities and gender stereotypes remain present within the education system (e.g., Bréau & Lentillon-Kaestner, 2017; Chaponnière, 2011; Fassa, 2013). The career choices of young people of both sexes thus remain very stereotypical (Gianettoni, 2011). In Spain, some sexist barriers remain in place within society with the dissemination of a patriarchal model that conveys men as the head of the household (Valdivia & al., 2010). The school participates in the reproduction of a separate and stereotyped model (Castillo Andrès & al., 2012) and many actions are being set up to promote better gender equality (Colás, 2007).

5. Method

5.1 Sample

In our study, the pupils surveyed through the questionnaires and focus groups were all volunteer pupils, enrolled in Swiss or Spanish primary schools. As regards the questionnaires, 120 pupils participated in the study (55 boys and 65 girls). A total of 74 questionnaires were collected in Switzerland and 46 in Spain. As for the focus groups, 36 pupils participated in the interviews. Twenty-four (12 boys and 12 girls) were enrolled in Swiss schools and 12 (6 boys and 6 girls) in Spanish schools

(Table 1). All pupils interviewed were between 4 and 7 years of age (M = 5.9, ET = 0.96).

Table 1. Distribution of pupils surveyed by country and the tool used.

	Questionnaires	*Focus Groups*	*Total*
Switzerland (%)	74 (61.66)	24 (66.66)	98 (62.82)
Spain (%)	46 (38.33)	12 (33.33)	58 (37.17)
Total (%)	120 (100)	36 (100)	156 (100)

5.2 Data collection tools

A mixed method was used for this study with the collection of questionnaires and the setting up of focus groups with young pupils. The development of data collection tools was carried out during the first PEERS exchange week in Barcelona.

Questionnaires. The place of gender stereotypes among primary school pupils was first measured by asking them to answer a questionnaire. This was comprised primarily of closed questions. Twenty-seven questions were put to the pupils, questions divided into two different areas: physical and sporting activities and toys. To facilitate the understanding of the participants, each question was accompanied by an image. For all the questions, the pupils interviewed were asked whether the activity presented was more for girls (1), for both (2) or for boys (3).

Focus groups. The aim of the focus groups was to access more accurately the point of view of the pupils about different activities. The focus groups were conducted using a stimulus (pictures showing different toys or sporting activities) that aimed to trigger an exchange of ideas or opinions among participants. First of all, the pupils were asked to tell the researcher whether they thought that the activity presented in the form of images was more for boys, for girls, or for both genders. Then, the researcher presented new images to the pupils, images contrasting with the gender stereotypes (e.g., a girl playing football, boys playing with

dolls) and invited them to share their opinion ("Is it normal?," "Have you ever seen boys playing with dolls?").

5.3 Procedure

The objectives of this study and the various data collection tools were first presented to various schools and school principals to find volunteer teachers to participate in this study. The data collection took place between November 2014 and March 2015, just after the tools were developed in Barcelona and before the second PEERS meeting in Lausanne.

Questionnaires. Pre-tests were conducted with ten or so pupils to ensure the correct understanding of all the questions. The questionnaire was conducted in seven different schools (four in Switzerland and three in Spain). The pupils were invited to answer questions at the beginning of the physical education and sports lesson in the joint presence of the researcher and the class teacher. It took on average between 15 and 20 minutes to answer the questionnaire. The presence of the researcher made it possible to answer any questions asked by the pupils. The questionnaires were then collected straight after being completed.

Focus groups. A total of nine focus groups were conducted with pupils from the canton of Vaud in Switzerland (n = 6), and from Barcelona in Spain (n = 3). All these focus groups were filmed. They took place during school hours in a neutral place (a classroom), chosen by the researchers, and in a relaxed atmosphere. Of the nine focus groups, seven were conducted in a mixed context, one with just boys, and another with just girls. The pupils were reassured at the beginning of the session that anonymity and all opinions would be respected. A sufficiently large number of pupils was convened (between three and six pupils) to promote interactions (Kitzinger, Markova & Kalampalikis, 2004). Each focus group lasted between 20 and 30 minutes. Two researchers were systematically present during the interview (a facilitator and an observer). The role of the facilitator was to facilitate the focus group and encourage participants to give their views, namely by creating a climate of confidence. The observer was present to ensure proper operation of

the recording equipment and to pick up on "key words" or other "non-verbal behavior" observed in the focus group and likely to be used in the thematic analysis. However, the observer had to be neutral, with no participation in the debate.

5.4 Data analysis

Two independent variables were taken into account in the analysis of the quantitative and qualitative data: the gender of the pupils (male or female) and the country in which they are educated (Switzerland and Spain). The analysis of the data was carried out in particular at the second PEERS meeting in Lausanne in March 2015.

Questionnaires. One-factor ANOVAs (Analyses of Variance) were applied to data from the questionnaires using SPSS software version 22. The significance threshold retained was $p < 0.05$.

Focus groups. The recordings were transcribed in full. The analysis was primarily based on the verbatim accounts but also on the notes of the observer. The interviews were the subject of several readings and the researcher conducted a thematic content analysis (Mucchielli, 1998) to highlight different themes related to the role of gender stereotypes in sport and physical activities and toys. In the course of the readings, the data could thus be classified into categories and subcategories. Two main categories emerged from the content analysis: the views of pupils about physical activity and sports, toys, and their relationship towards masculinity and/or femininity, and the various arguments used by the pupils to justify their views (experience, family, school).

6. Results

6.1 Physical and sporting activities

Football: A primarily male activity, both in Spain and in Switzerland. The answers given to the questionnaires show that pupils from both countries consider football as a male sport. The Spanish pupils, however, show a higher average (M = 2.73) than the Swiss students (M = 2.45), F (1, 119) = 5.80, p = 0.01. Spanish boys consider football as a more masculine activity (M = 2.79) than Swiss boys (M = 2.48), F (1, 53) = 5.80, p = 0.01. Among the girls, the same observation can be made (M = 2.68 *vs* 2.44), F (1, 63) = 3.43, p = 0.06. Within the focus groups conducted in Spain, of 12 students interviewed, 9 said that football was for boys ("Oh, football is our thing," Lucas). Only two girls explain that girls "can play" (Elisa) and that "it is a sport for both" (Lamara). In Switzerland, the pupils also ranked football as a primarily male activity (20 out of 24 pupils). Some boys even admit that playing football with girls "is weird, because normally girls don't play football" (Luc). Only two Swiss boys explained that girls also play football. The girls willingly recognize that football is rather masculine. In particular, they explain that boys are "stronger" (Marine). Two girls point out that they have as much right to play as boys, even if they admit that "not many girls play football. Only boys. We are more used to seeing boys play" (Pauline).

In both countries, some boys admitted that girls could play with them. For Andre, "girls can play sometimes." The Spanish pupil explains, however, that boys are better at football. Lucas shared this observation: "I know a girl who plays but not as well as I do." In Switzerland, during a focus group conducted only with boys, silence fell when the image showed a girl playing football. The pupils quickly talked about break time and "girls who never play," "it doesn't exist" (Jacques). While some girls admit that they do not play during break time, others explain that the problem in school is that "the boys don't let them play" (Charlotte).

Dance: An activity for girls, especially in Spain. The Spanish pupils classify dance as a feminine activity (M = 1.15), while the Swiss pupils see it more as an activity for both genders (M = 1.75), $F(1, 118) = 41.39$, $p < 0.001$. This finding re-emerges in the answers of the girls, both in Spain and Switzerland (M = 1.04 vs. 1.69), $F(1, 63) = 38.90$, $p < 0.001$. The Spanish boys also share this view with respect to the Swiss boys that associate dance rather as an activity for both sexes (M = 1.25 vs 1.83), $F(1, 53) = 13.29$, $p = 0.01$. In the focus groups, the differences in answers between pupils of the two countries are narrower. Very quickly the finding that dance is a female activity emerged. Of the 36 pupils surveyed in total (Switzerland and Spain), 30 consider that dancing is for girls. As for Spanish boys, dance is "something feminine" (Andre). Only four boys in the two countries combined cite dance as a neutral activity. The girls share this view and explain in particular that there are always more girls doing dance. Even if "it's not prohibited, dance is a lot more for girls than for boys" (Charlotte).

Boys who dance: Between laughter and shame. When the researcher mentions the possibility for the boys to dance, some Spaniards say they "would be ashamed," and "would be embarrassed" (Lucas). In Switzerland, this view is shared with, in particular, the fear of having "to dress like a girl" (Christophe). In three of the focus groups conducted, the image of a boy dancing triggered silence and mockery. For Luc, boys who dance, "means that they're a bit barmy." For the girls, seeing boys dancing "is weird" (Lucie) but "it's not forbidden" (Pauline).

6.2 Toys

Dolls: A symbol of the feminine universe. The Spanish pupils do not hesitate to classify dolls as a female toy (M = 1.21) while the Swiss pupils associate them rather with a toy for both sexes (M = 1.55), $F(1, 119) = 9, 95$, $p = 0.02$. These differences are confirmed in the comparison between the genders, especially among Spanish boys who believe that playing with dolls is primarily a female activity (M = 1.12 *vs* 1.71), $F(1, 53) = 11.66$, $p < 0.001$. Among the girls, the results of the questionnaires

show no significant differences, F (1, 63) = 0. 91, p = 0.34. Within the focus groups, playing with dolls quickly emerged as an activity for girls, both in Spain and Switzerland. All pupils shared this finding. It's "100 % for girls" (Jacques), "of course it's for girls" (Andre), "sure and certain" (Elisa), "all girls like Barbies" (Christophe). Only one boy said he had already played with Barbies with his sister. In Switzerland, one pupil defended the interests of playing with dolls to "learn to be a mummy, learn to babysit" (Mélanie).

Being a boy and playing with dolls. When pupils saw the image of a boy with a doll, they pulled faces and started laughing: "now that's funny" (Eric), "yuck especially not Barbies" (Luis). Very quickly some boys said they never played with dolls. While some pupils found it to be "original" (Luc), others preferred to say that it was "bizarre, it's not normal for a boy to play with a doll" (Charlotte). The pupil draws in particular on the example of the parents: "Daddies aren't mummies, I've never seen a daddy looking after a baby." These different remarks were shared by a majority of pupils, both Swiss and Spanish, boys and girls.

Toy cars: A decidedly masculine space. The questionnaire results show no significant differences between the Swiss and Spanish pupils when it comes to toy cars, F (1, 119) = 2.45, p = 0.12. During the focus groups, in both surveyed countries, playing with toy cars emerged as a male activity. All the boys said they played or had played with toy cars. Few girls said that they spent time playing with this type of toy: "Girls can play but it's the boys who like playing and often girls don't enjoy it much" (Mélanie). In Spain, Lucas explains that while "girls can play, it's not really for girls," "it's more for boys" (Elisa), "it's not very feminine" (Andre). Finally, it emerged from the focus groups that while girls can play, "they have the right but just for a while" (Jacques).

7. Discussion

It emerges from this study that gender stereotypes in connection with sporting activities and toys are already entrenched among pupils aged between four and seven years old in a primary school environment. Whatever the image shown (football, dancing, dolls, and toy cars), the Swiss and Spanish pupils make a distinction between the activities and contribute to maintaining the division between male and female (Butler, 2004). The stereotyped comments made by a large majority of pupils confirm the work done on the construction of gender identity, in particular the "gender stability" stage (Kohlberg, 1966; Martin & Halverson, 1981). The answers given by the pupils translate their willingness to respect the norms and gender roles (Mieyaa & Rouyer, 2010). Differences in answers were observed between the two countries, particularly in terms of the questionnaires, the Spanish pupils adhering more strongly to different gender stereotypes. These results finally confirm the importance for this country to continue the reflection and the fight against sexism present in schools and in society at large (Valdivia & al., 2010).

Regarding the physical and sports activities, the answers given and comments made by the pupils confirm a gender separation of practices (Hardin & Greer, 2009). A large majority of students thus describe football as a masculine activity. The girls stand back and do not get very involved in this activity, neither in Spain nor Switzerland. This finding is widely echoed in the work highlighting the lack of girls' participation in collective activities (Davisse, 2010; Vigneron, 2006). While mixed football teams present challenges (Moreno, 2006), it seems essential to continue the reflection on the content and assessment of team sports (Baena-Extremera & Ruiz Montero, 2009). A better distribution of roles on the ground between pupils is one way in which teachers can intervene, valuing girls' actions and allowing them to develop in not only peripheral roles (e.g., goalkeeper, defender) (Vigneron, 2006). Rethinking the participation of girls in football also means enabling them to acquire new skills and a stronger sense of

competence (Pontais, 2013). In contact with the boys, Le Goff (2002) proposes the setting up of mixed teams in football, but also in other activities (badminton, athletics, dance) in order to allow the pupils to learn and progress together. Far from neutral, the choice of activities and their programming is intended both to create dynamic dyads and to encourage a change of "leader" in order to go beyond a tutoring that is too often unidirectional, where "boys help girls."

As for dance, it continues to be primarily regarded by pupils, in particular Spanish pupils, as a feminine activity. These results approve other studies (Dowling Naess, 2001, Gorely & al., 2003) which confirm the feminine image given to artistic activities by young pupils. In Spain, a reflection on teacher training in artistic activities is being considered (Villar Lopez, 2011). This training seems necessary to "democratize dance" (Padilla & Zurdo, 2003). Allowing students to engage in a genuine artistic experience, such as making a show at the end of the year (Bréau, 2013; Crance, Trohel & Saury, 2014), is an option to combat gender stereotypes. Other proposals suggest that students, especially boys, put words on their feelings and emotions during dance lessons (Gard, 2008). Artistic activities must today be part of the educational offering proposed to the pupils, an offering too often limited to performance activities, considered as masculine. (Lopez-Villar, 2011; Pontais, 2013).

Toys are also subject to gender separation between male (toy cars) and female (dolls). The attitude of the Swiss and Spanish pupils towards toys again reinforces gender norms already present in society (Zegai, 2010). For boys, it seems impossible or at least difficult to play with dolls. These results echo in particular the work carried out on the lack of freedom left to boys and the eagerness of parents to see their children play with toys more consistent with their gender (Collet, 2011). Incidentally, in Spain, 27.2 % of parents still believe that children should play with gender-relevant toys (Lopez-Villar, 2014). To enable each pupil, girls and boys alike, to grow into free and happy adults comfortable with their own identity, it seems essential that they are offered a maximum range of toys. Awareness-raising among parents and work within schools play an important role in the process of deconstructing gender norms and gender

stereotypes. Allowing the pupils to express themselves with a maximum range of toys is particularly important given that the gender identity of the pupils is also built through these manipulations and experiences (Rouyer, 2007).

While our study looked at the views of pupils about gender stereotypes in the course of different activities, future research on the construction of gender identity could be carried out to understand how pupils act and interact in the course of different activities that are more or less stereotyped. The work conducted today around "doing gender" highlights in particular the richness and relevance of observation measures (West & Zimmerman, 1987). Moreover, through the continuation of the PEERS project, new courses of action, used in class or in PE class, could be implemented in order to combat gender stereotypes (e.g., Bréau, Ribalta-Alcalde & Lentillon-Kaestner, 2016; Muller & Olgiati, 2016).

8. Conclusion

This study stressed the adherence to gender stereotypes by young pupils educated in Switzerland and Spain. In both countries, sports and toys are the subject of a real division and a gender separation. The comments made by the pupils confirm the broader presence of a divided and gendered society (Butler, 2004). The maintenance of gender stereotypes nevertheless limits the personal and professional success of the young adults of tomorrow, and their freedom to participate in all activities. Reflection and work around the "deconstruction" of gender norms seems necessary (Cuddy, Fiske & Glick, 2008). At school, enabling teachers to think about the gender issue seems important, as the report published by the European Commission (2009) emphasizes that teachers and trainers can sometimes adopt a conservative attitude. In Switzerland, the training offered to future teachers should enable access to a "gender competence" (Liebig, Rosenkranz-Fakkegger & Meyerhofer, 2009), which promotes awareness of gender inequalities

and certain discourses and other stereotyped attitudes. At the University of Teacher Education of State of Vaud, a new office, which opened in April 2014 for the promotion of equality between women and men, would like to participate in the establishment of lessons that combat gender stereotypes and encourage the construction of plural and authentic identities among young pupils. The office for equality between women and men provides HEP Vaud teachers and students with teaching aids to discuss with students the question of equality between the sexes. In Spain, the issue of teacher training is also a priority for the development of a more egalitarian, equitable, and just society (Belalcazar, 2011). Schools and teachers should participate in this work which must at all cost be conducted with primary level pupils as "children do not internalize the world of their significant others as a possible world among many others. They internalize it as the world, the only existing and conceivable world, just the world" (Berger & Luckmann, 2006, p. 184).

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Chapter 12: Teaching food practices and sustainability in an international context

Abstract
This chapter presents the results of a PEERS project conducted during the academic year 2012–2013 between the HEP Vaud and Lesley University in Boston. The focus of the study is on the teaching of food in the context of education for sustainable development. After a presentation of the theoretical framework, the project is presented in its various dimensions (process, analyzes carried out, discussion and perspectives). In the conclusion, the author shows how research and training combine in such a project. He also referred to the need to allocate the necessary resources for the generalization of such a program

Introduction

The PEERS program – Students and researchers social networks projects – was developed by the University of Teacher Education of State of Vaud (HEP Vaud) with the aim of connecting two teaching institutes, but also to guarantee the broadening of the academic horizon and to improve the quality of the research and courses.

This chapter presents a project which was led during the academic year 2012–2013 and which object was Teaching food practices and sustainability in an international context. We will first present our theoretical framework and the research questions. We will then describe the methodology of the project. The third section presents the results,

that is to say the common work, the analysis of lesson preparations and teaching and the point of view of the students. In the last section, we discuss our results and propose some actions that we could carry out in the future.

1. Food, education for sustainable development (ESD) and global competence

Food is now a controversial subject both in academia and in society more generally: food scandals are regular occurrences and give rise to new studies, but these fail to reassure the population. At the same time, food resources are not fairly distributed over the Earth's surface, so that 795 million people are underfed (FAO, 2015). The rapid growth in the world's population (expected to reach 9 billion by 2050) makes it urgent now to find the solutions required to feed everyone.

A further issue arises from the fact that food production has a major impact on the environment: greenhouse gases are produced in the various stages of the food cycle (production, processing, storage, consumption, recycling, etc.). Plant health chemicals (pesticides, insecticides, fungicides) are used in many branches of production chains. These are damaging for the environment and also for health. Finally, we know that industrial foods create problems of overweight and obesity. Enabling pupils to understand these problems and take part in the public debate is now an objective of most curricula and goes far beyond the teaching of the scientific disciplines, meaning both the natural sciences and the human and social sciences. This kind of education forms part of what is now commonly called education for sustainable development.

According to UNESCO (2012), education for sustainable development should enable everyone to acquire the knowledge, competences, attitudes and values needed to build a sustainable future. This education implies both conventional forms of teaching and learning

and also some new forms. The Global Monitoring and Evaluation Survey (GMES) distinguished the following nine forms:

1. Discovery learning;
2. Transmissive learning;
3. Participatory/collaborative learning;
4. Problem-based learning;
5. Disciplinary learning;
6. Interdisciplinary learning;
7. Multi-stakeholder social learning;
8. Critical thinking-based learning;
9. Systems thinking-based learning.

Among these nine forms, the seventh is precisely what we are aiming to develop in the PEERS project. Multi-stakeholder social learning means "*bringing together people with different backgrounds, values, perspectives, knowledge and experience, from both inside and outside the group initiating the learning process, to set out on a creative quest to solve problems that have no ready-made solutions*" (UNESCO, 2012, p. 26).

As regards content, we have also sought to develop systems thinking-based learning. We wanted the students and their pupils to look for "connections, relationships and interdependencies to see the whole system and recognize it as more than the sum of its parts and to understand an intervention in one part affects other parts and the entire system" (*ibid*.). On this point, our previous researches showed that pupils are able to mobilize elements of complex thinking – in particular relations of linear causality between several elements. More elaborate elements, such as chains of multiple causalities, feedback loops or observation of dialogic tensions, appear more rarely (Pache, Hertig, Curnier, 2017). Complex thinking is therefore only partially engaged, especially because the pupils have difficulty in identifying the thinking tools that contribute to it. One hypothesis to explain this gap is that these tools are not clearly identified by the teachers themselves and that the sequences set up often mobilize cross-cutting research procedures and only rarely include phases of institutionalization of the tools for complex thinking (*ibid*.).

The main concept of our research, "food", can be regarded as a relational concept (Bruner, 1966), i.e. a concept that is defined in relation to other concepts with which it is closely connected. To define these concepts, it is useful to draw on the works of the American geographer L. C. Smith (2011), who examines four global forces that explain the world of today and tomorrow, namely demography, natural resources, globalization and climate change. As geographers ourselves, we would add the concept of the stakeholder and that of social injustice, the latter referring more to the issues involved in education for sustainable development. Interrelating these various concepts, we obtain the food concept network shown in Figure 1 below.

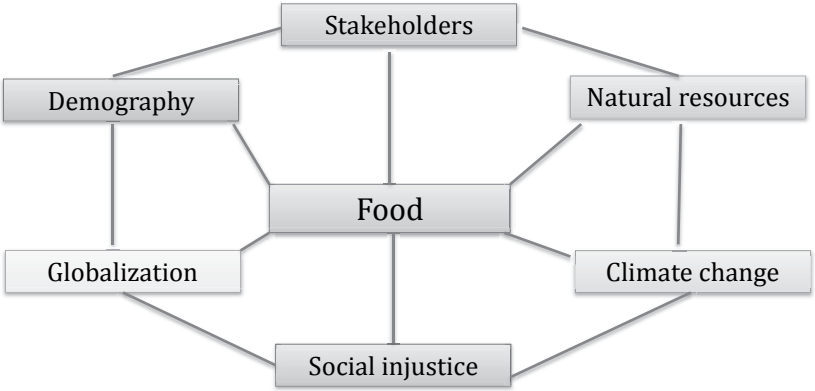

Figure 1: Food concept network.

Previous studies showed that young teachers prefer the words circulating in the social space, to the detriment of the concepts and methods of academic geography. With regard to the choice of situations, they give preference to narratives of action, real or fictitious, which allow pupils to confront authentic social situations (Pache, 2014).

Tackling such content in systemic terms and in collaboration with other students implies possession of what some authors call a global competence (Mansilla & Jackson, 2011). By global competence, we mean "*the capacity and disposition to understand and act on issues of global*

significance" (*ibid*., p. xiii). More precisely, this competence consists in understanding the world through disciplinary and interdisciplinary study. It also requires mastering the following four sub-competences:

– Investigating the world beyond one's immediate environment;
– Recognizing one's own and others' perspectives;
– Communicating ideas effectively with diverse audiences;
– Taking action to improve conditions.

As shown in Figure 2, these four sub-competences can each be associated with one of four objectives which will serve as guidelines with a view to training citizens who are aware of and curious about how the world works today and will work in the future.

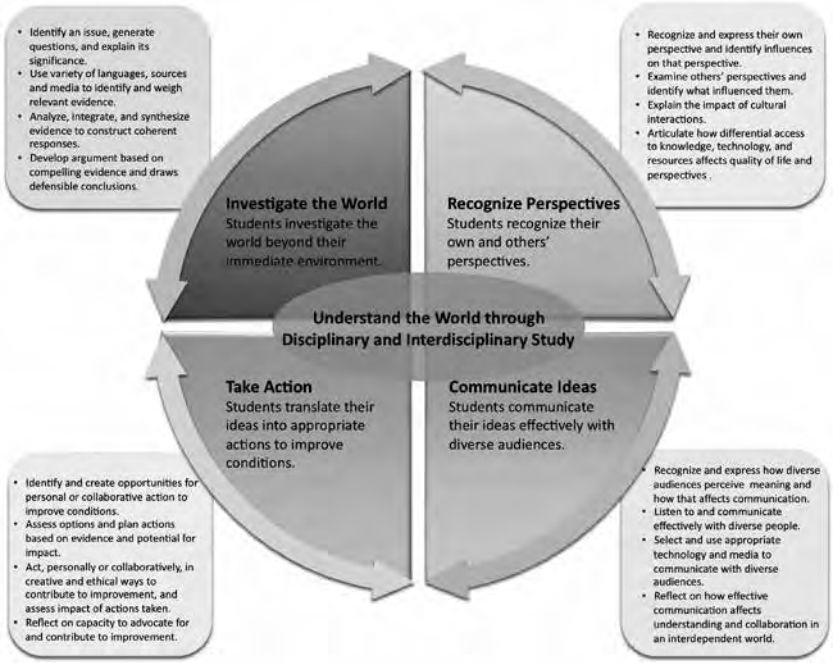

Figure 2: Objectives in developing global competence (Mansilla & Jackson, p. 12).

At this stage, we can formulate three research questions:

– What are the didactic choices made by young teachers to teach food in a sustainable development perspective?
– What knowledge is taught?
– What benefits do young teachers get from the PEERS project?

2. Methodology

In this section, we'll describe the research-training process. The first step was to recruit three students. We set a number of criteria, such as interest in the project, knowledge about education for sustainable development (ESD) and proficiency in English. During the second step, the students were encouraged to make contact with one another through social and chat media (Skype, Facebook). When the topic had been set out by the instructors, the students embarked on an initial exchange of ideas to prepare for the working week in Boston. The third step took place in Boston and the main goal was to develop a teaching sequence on food from an ESD perspective. The fourth step was to implement the teaching sequence in the student's classroom. Finally, the last step was to analyze the process and identify the skills developed by the students (Figure 3).

Steps	*Calendar*
1. Recruitment of three students	September 2015
2. Curriculum study	October and November 2015
3. Planning a Teaching Sequence	December 2015 (in Boston)
4. Teaching in the classes of the students	February to March
5. Analysis and reflection on the research-training process	April (in Lausanne)

Figure 3: The fifth steps of the research-training process.

To analyze our results, we apply the principle or triangulation. The concept of triangulation takes into account the relativity of the points of

view, necessary for the examination of the diversity and the complexity of the human being. This approach is opposed to the univocal approach whose ambition is to identify reality from a privileged angle (a single tool, a single theory, a single observer). Triangulation, on the other hand, aims to put into debate the various stages of research in order to avoid the ideological closure. It promotes the implementation of multiple lightings in order to follow reality in its spatio-temporal movement and in its complexity (Pourtois, Desmet & Lahaye, 2006).

3. Results

In this section, we'll present our results in four steps: the work in Boston, the work in Lausanne, the analysis of lesson plans, the evaluation of teaching and the students' point of view.

3.1 The work in Boston

During the week in Boston, the group met each other and reflected on the object of the project, that is to say food and sustainability. After several discussions, the students built the framework of the teaching unit, which is composed of six steps:

1. The first lesson looks like an "icebreaker", which aims to create an interest for the pupils, to fix the theme of the study and the problem to solve. It was decided to work on several food products to establish the "history" of the product, for example the place where it was produced, the transport or the place where it was sold;
2. The second lesson focuses on different supply food chains:
   - o The industrial food chain;
   - o The local food chain;
   - o The organic food chain.

3. The third lesson focuses on series of practices in both contexts (Boston and Lausanne). The aim is to discuss the impacts of the practices and maybe realize what they could learn from each other.
4. The fourth lesson aims to show a way to grow plants or vegetables. Biodiversity and organic food are at the core of the lesson. At the world scale, the pupils will learn the aims of the Global Seed Vault (Svalbard, Norway).
5. The fifth lesson will show the relationships between food and lifestyles. Indeed, food depends first of all of political decisions, like the Irish Great Famine showed it.
6. Finally, the sixth lesson will consist in organizing a debate in which pupils will argue their opinion on the following controversial issue: Which kind of food and practices do we need for a sustainable world?

In the same time, the students had the opportunity to visit a school, which was working with the principles of sustainability. They could speak with a professional who cooked with organic food. They assisted a course about political sciences and, last but not least, they visited an organic farm. They conserved documentation about this investigation, either with recording or with photographs.

3.2 The work in Lausanne

During the week in Lausanne, we continued our investigations into sustainable food. For example, we visited the Lavaux vineyard, which has been a UNESCO World Heritage Site since 2007. In discussion with a winegrower, the students were able to understand the issues involved in conserving such a territory. They were also made aware of the Swiss system of direct democracy, which enables various social actors to propose popular initiatives.

With a visit to an organic farm[1] the students were then able to make comparisons with the work done in Boston. In particular they learned that

1 The Vulliemin family farm at Pomy. See website: <http://www.vullieminpomy.ch>.

most Swiss farms are small family undertakings, selling their produce directly to a clientele who increasingly appreciate this way of buying and re-establishing contact with the producer.

The students also attended classes both at the internship sites of their Swiss partners and within the HEP Vaud. The latter comprised a course on sustainable development education and a workshop on the natural sciences.

Finally, in formal and informal meetings, and also around the experiments conducted in the internship classes, the students had many opportunities to discuss the particular features of their respective school systems.

3.3 Analysis of lesson plans and evaluation of teaching

In this section, we first analyze the students' lesson preparations and then the teaching actually given.

3.3.1 Analysis of lesson preparations

Although the students agreed on an identical structure for their teaching practice, it is interesting to observe differences in implementation. These were seen both in the structuring of the lesson and in the content addressed. For example, the American students systematically planned an evaluation at the end of each lesson whereas the Swiss students intended to evaluate the pupils in the final debate. We also noted that for the American students, each lesson corresponded to a question. By contrast, questions did not necessarily appear in the Swiss students' lesson preparations. Their lessons correspond more to stages in the building up of knowledge, which, in Session 6, should enable the pupils to take up a position in the debate (on the topic: "What is sustainable food?").

The ideas addressed also differ, as shown in Figure 4. In Lesson 2, for example, the Swiss students emphasized the impact of industrial food production, whereas the American students opted for a climate-based approach to explain the importation of products. In other words, the

positioning is not the same: on the one hand the aim to question the food industry and its imports, on the other hand it is to provide an argument to justify importing.

Lesson 3, which unfolded very differently on the two sides of the Atlantic, also provides an interesting contrast. Whereas the Swiss students asked their pupils to write a letter describing their diet, the American students emphasized the knowledge needed to set up a vegetable garden.

	Boston	*Vaud*
Lesson 1	Origin, distance, climate, local, greenhouse gases, sustainability	Origin, distance, means of transportation
Lesson 2	Climate, zones, time, California, Midwest	Imports, food industry, impact on environment, impact on employment, greenhouse effect, gray energy
Lesson 3	Plants, nutrients, photosynthesis	Diet, sustainable food
Lesson 4	Sustainable food, production methods (industrial, local) Irish Famine Costs of a farm	Plants, nutrients, photosynthesis
Lesson 5	Control, lifestyles, businesses, politics, religion, food data bank	Politics, lifestyles, history of the potato
Lesson 6	Costs, percentage of income spent on food, values	Sustainable world

Figure 4: Ideas addressed in lessons.

3.3.2 Analysis of actual teaching

In this sub-section, we look more closely at two moments that strike us as particularly interesting: the writing of letters to the American counterparts and the final debate.

The writing of letters seems to us to be a beneficial activity in several ways in the context of education for sustainable development. It requires knowledge of a certain number of concepts, such as "diet" or "sustainable food"; the pupil must decenter herself and select information that is potentially interesting to the American pupils; and it contributes to participatory learning, since it teaches the pupil to enter into contact and therefore communicate. Figure 5 gives an example of a letter sent by a Swiss pupil.

Hi students,
At this moment, in sciences, we are learning about sustainable food. So I'm writing you about my daily diet.
We learned that in other countries, they don't have a lot to eat and that some meals we eat have traveled hundreds and thousands of kilometers!!!
My diet:
In the morning, I'm not necessarily hungry so I just drink a glass of milk.
At a pinch, I have bread roll with raspberry, cherry or apricot homemade jam.
At noon, it's more varied, if I'm going ice-skating, my mother makes me tortellini; if I have more time to eat at home she cooks something else.
In the evening, my mother or my father cooks us the leftovers of the other days.
But sometimes, when my parents want to, we go to the restaurant, most of the time Asian because my father is Asian.
I think that the best for sustainable food is not to eat strawberries in winter, therefore eat seasonal products!!!
I hope to hear about you soon!
Sophie Tran

Figure 5: Letter written by a Swiss pupil.

Secondly, we would like to look again at the debates organized in the students' classes. These debates belong to a more general theoretical framework of learning to reason in relation to a controversial or socio-scientific question (Mäkitalo, Jakobsson & Säljö, 2009). What interests us in particular is the pupils' capacity to approach an

object from multiple points of view, adopting different speech genres (Bakhtine, 1986). For example if we take a simple object such as an orange, it can be envisaged in several ways, with the aid of different speech genres:

> The satisfied consumer may speak of its delicious taste and its juicyness, the dietician will speak of it in terms of nutritional value and richness in vitamin C, and the artist may attend to it in terms of its color, shape and texture in the context of what is to be a still life. At more abstract levels, we can think of the importer of oranges, the transport companies shipping oranges from their sites of production to consumers all over the world, and the economist, in her role as advisor to a multinational company, analyzing the supply and demand in the market for oranges, as thinking and communicating about oranges in very diverse manners. In the latter cases, the terms and concepts that are productive are very different from those that characterize the consumer enjoying his morning fruit or the shop owner trying to persuade customers to purchase fresh oranges (Mäkitalo & al., 2009, p. 7).

In the Swiss classes, the aim was to debate a dilemma. Indeed, the dilemma presents a strong heuristic potential, because it makes it possible to work explicitly a dialogical mode of thought (Morin, 2005; Audigier, Fink, Freudiger & Haeberli, 2011). The chosen dilemma was:

> *Should we choose lasagnas made by the local butcher or lasagnas from the supermarket?*

The pupils' capacity to decenter themselves is seen several times in the filmed debates. As well as the consumers, the pupils mentioned farmers, butchers, retailers, small shops, big supermarkets, and people with modest incomes. Sometimes other cultures are mentioned, such as Muslims who do not eat pork, or American culture as in Extract 1.

Extract 1:

1	Pupil M	But I'd like to come back to quantities. For example, in America… when I lived in America, well, the lasagna portions were… gigantic… And the well brought-up kids had to empty their plates completely… the whole portion… well, they would get enormous in a week.
2	Teacher	Right, so your concern is those portions. Would anyone else like to say something about the portions?

This extract also brings to light a somewhat stereotypical view of Americans. Contact between the two populations of pupils can therefore only be positive in nuancing such images.

However, the real interest of such a debate is as a means of stimulating prospective thought, in other words the capacity to think about the future. Extract 2 shows that it is difficult to conceptualize political action and more especially the conditions and consequences of several possible actions. The pupil confuses the economic and political registers when he suggests "lowering the prices"; and, in response to the teacher's question, he puts himself in the shoes of the actor he knows best, the consumer. So it can be seen that the link between sustainable food and the measures to be taken locally is not easy to make for pupils aged 11.

Extract 2:

1	Teacher	If we could change something, what would it be useful to change with a view to sustainable food… in terms of the environment?
2	Pupil S.	We could lower the prices.
		[…]
3	Teacher	What effect would it have to bring down the price of lasagnas?
4	Pupil B.	When people see it's cheaper they'll think it's not so good.
5	Teacher	So again it's about consumer confidence… […] That would be an argument. What else?
		[…]

3.4 The students' point of view

The students unanimously recognize the benefits of such a project. These benefits first relate to the topic in question: food and sustainable development.

For a majority of the students, immersion in the partner culture was particularly useful in helping them understand the content to be taught. The student most explicit on this point is Paola:

> *[The trip to America] changed me, it has enabled me to transmit something to children. Teaching is most effective when the teacher enters into the knowledge, masters it perfectly and transmits it to the pupils. And I'm very pleased with the interest I've managed to pass on to my pupils and all the knowledge that has remained in my teaching. They enormously appreciated this sequence and were also impatient to know what was coming next. I got them to understand difficult ideas like sustainable food, gray energy, and greenhouse gases. I am might not have found that so easy if I hadn't taken part in this project.*

But the benefits of the project also lie in the mechanisms set up for participation, such as the debate structure. One student, for example took the opportunity to set up a real evaluation of the pupils' competences.

In cultural terms, the students emphasize openness to the world, an ability to move beyond prejudices and stereotypes. For example, the Swiss students were surprised to see that a school in Cambridge was based on the principles of sustainable development (locally produced organic food in the school canteen, environmentally-friendly heating and insulation, for example).

The collaboration among students was also identified as a strong point. The teaching sequences were put together by teams of students, the work was divided, and the final product was judged to be extremely rich and comprehensive.

Finally, the Swiss students emphasize the importance of a good command of English for carrying this project through.

4. Discussion and perspectives

In this part, we will resume our research questions, in order to answer them systematically.

What are the didactic choices made by young teachers to teach food in a sustainable development perspective?

Our results show that young teachers favor working around social situations: writing a letter to American partners and implementing a debate on a controversial issue. Thus, the first steps of the approach aim to build the reference knowledge to enable students to reinvest them in situations. According to some authors, this approach is similar to a problem of detour and return. This means that building societal problems related to sustainable development involves identifying, in the contributing disciplines, the resources – knowledge, know-how, attitudes – to find reasoned solutions. But the solutions and the decisions to be taken are not deduced mechanically from this or that science. They are choices that combine scientific knowledge and other knowledge (Audigier, Fink, Freudiger & Haeberli, 2011).

What knowledge is taught?

The knowledge taught is of several types. First, there is evidence-based knowledge: the greenhouse effect, production-consumption chains, sustainable food, lifestyles, etc. There are also know-hows: reading labels, comparing texts and points of view, reading a graph. Attitudes are found: to be critical, to explain the complexity of phenomena, to project themselves into the future. Finally, we find citizen competences (Audigier, 2000): cognitive skills relating to the organization of powers and the legal conditions for action and decision; ethical competencies that identify the links between situations and values, such as human rights; social skills, and how to interact with others and decision-making and action capacities.

What benefits do young teachers get from the PEERS project?

By implementing such a project, young teachers have implemented various skills. They have developed a critical assessment of food supply chains, consumption practices and the role of different actors. They built an interdisciplinary learning teaching approach with common objectives and then implemented it in their internship class. They have also used information and communication technologies effectively to interact with their partners. Finally, they have identified criteria for evaluating their project and the professional skills they have built.

5. Conclusion

In conclusion, the trainers researchers that we are would like to recall three points.

The first refers to the idea of a research community. Indeed, such a project, built over a year, allows us to build a group that thinks together, develops interpersonal skills and becomes aware of the collective weight or collective competence. It is very reassuring for young teachers who do not yet master all the objects to be taught.

The second aspect refers to training. We believe that such a form of training is essential for training in education for sustainable development. Indeed, to develop a global competence (Mansilla & Jackson, 2011), it is essential to propose devices that are out of the ordinary and that invite action. The only disadvantage of these devices, however, is that they are costly and time consuming and only affect a small part of the students. All that remains to be done is to reflect on the modalities of generalizing such a program in the training of teachers.

The third point refers to benefits for the faculty members: it was very interesting to discuss about researches and various teacher training strategies. Such an experiment permitted to enlarge our scientific networks and to initiate a fruitful collaboration.

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Chapter 13: A Comparative Analysis between Physical Education, Physical Fitness, Motivation, & Self-Concept in Middle School Swiss and US Students

Abstract
An international exchange (PEERS program) was realized between physical education (PE) teacher students and teacher educators from Switzerland and America. This collaboration was used to develop an international research project. The purpose was to compare the physical fitness, motivation, and self-concept of Swiss and American students in (PE). Participants included 418 students from middle schools in Switzerland (n=301) and the US (n=117). *Fitnessgram* physical fitness measures included cardiovascular endurance (PACER), muscular endurance (curl-ups), muscular strength (push-ups), flexibility (back-saver sit-and-reach), and body composition (BMI). Questionnaires included the Motivation in Physical Activity Measure-Revised (MPAM-R) and the Physical Self-Description Questionnaire-Short Form (PDSQ-S). A MANOVA was used to test statistical differences between the groups. Results showed that the Swiss students had higher cardiorespiratory endurance levels but lower motivation (enjoyment, competence, fitness) and self-concept scores (endurance, strength, flexibility, self-esteem) than American students. Further studies on larger samples should be carried out to confirm these results.

1. Introduction

An international exchange (PEERS project) was conducted during three school years between physical education (PE) teacher students and teacher educators from the State of Vaud of Switzerland (3 students, 1 professor) and the State of California of the United States of America (3 students, 2 professors). This collaboration was useful to discover the teaching of PE in both countries and to develop international research projects. This chapter aims to present the results of an international research project for the first two years. The purpose of this study was to compare the physical fitness, motivation, and self-concept of Swiss and American students in middle school PE classes. Because of differences in health behaviours and outcomes between Switzerland and United States, we hypothesized that Swiss middle school PE students would have higher fitness levels, greater physical activity motivation and greater self-concept than US students.

2. Theoretical Framework

2.1 Physical Fitness, Motivation, and Self-Concept among Swiss and American Students

PE has a role in the development of physical fitness, self-concept, and motivation (Castelli & Beighle, 2007; Tappe & Burgeson, 2004).

2.1.1 Physical fitness

PE provides opportunities for students to refine motor skills, to be physically active and to gain physical fitness (Castelli & Erwin, 2007). The five components of health-related fitness include cardio-respiratory endurance, muscular strength, muscular endurance, flexibility and

body composition. Fitness testing is a commonly used practice within the school PE curriculum of many countries (Morrow, Zhu, Franks, Meredith, & Spain, 2009). Few studies have estimated fitness condition because of conceptual and technical problems (Michaud & Narring, 1996; Naughton, Carlson, & Greene, 2006). In the United States, the Fitnessgram is a fitness assessment and reporting program for youth, first developed in 1982 by The Cooper Institute. The assessment includes a variety of health-related physical fitness tests that are used to determine students' overall physical fitness and suggest areas for improvement when appropriate (see <www.fitnessgram.net> for more information). The Fitnessgram is considered a valid and reliable measure of children's physical fitness and has been used in previous research to measure physical fitness (Castelli & Valley, 2007; Welk, Morrow, & Falls, 2002). Being overweight has some consequences on the students' experiences in PE (Trout & Graber, 2009). Trout and Graber (2009) showed that many overweight students perceived physical education to be of little or no benefit to them, due to negative experiences in PE. From a motivational standpoint, it is unlikely that students would desire to participate in a class if they believed it was not valuable. Castelli and Valley (2007) showed that engagement in physical activities among children was most likely influenced by the individual's aerobic fitness, overall physical fitness, and motor competence. In addition, Jaakkola & al. (2013) found that physical fitness was positively related to perceived competence of students, which in turn had a positive association with situational intrinsic motivation of students toward fitness testing class.

2.1.2 Physical self-concept

Physical self-concept is a predictor of physical activity (Castelli & Valley, 2007; Hands, Larkin, Parker, Straker, & Perry, 2009; Spessato & al., 2013). A number of researchers have suggested that what students believe and how they think and feel can affect achievement in many ways (Lee, Carter, & Xiang, 1995; Motl, 2007). There is evidence to suggest that beliefs about ability and competence may be precursors to positive motivational patterns in students (Jaakkola & al., 2013; Nicholls, 1984). Perceived competence is related to successful performances in PE (Gao,

Lodewyk, & Zhang, 2009; Xiang, McBride, & Bruene, 2004, 2006). For example, Gao & al. (2009) showed that middle school students' ability beliefs emerged as significant predictors of Progressive Aerobic Cardiovascular Endurance Run (PACER) test scores.

2.1.3 Motivation

In addition to physical self-concept, motivation is an important factor implied in learning in PE. Concerning motivation in exercise and sport, the distinction between intrinsic and extrinsic motives for participants is very important (Ryan, Frederick, Lepes, Rubio, & Sheldon, 1997; Vallerand, 2004). Intrinsically motivated behaviours are those performed for the satisfaction one gains from engaging in the activity itself. According to most theories, the primary satisfactions associated with intrinsically motivated actions are experiences of competence and interest/enjoyment (Ryan & al., 1997). Thus, for the purpose of the current study we considered individuals whose participation was motivated mainly by competence and enjoyment as primarily having an intrinsic focus. By contrast, extrinsically motivated behaviours are those that are performed in order to obtain rewards or outcomes that are separate from the behaviour itself (Ryan & al., 1997). In the current study, we considered students who have body-related motives as primarily extrinsically focused, since their goals concern outcomes extrinsic to the activity per se. A student can develop both intrinsic and extrinsic sport motives, but their salience differs (Ryan & al., 1997). Contrary to extrinsic motives, intrinsic motivates facilitate positive outcomes such as well-being and academic achievement (Deci & Ryan, 2000; Lemos & Verissimo, 2014; Levesque, Copeland, & Pattie, 2010; Motl, 2007; Vallerand, 2004).

2.2 Difference in Health Behaviours and Outcomes Between Switzerland and United States

The *Health Behaviour in School-Aged Children* (HBSC) is a World Health Organization (WHO) collaborative cross-national study, in which

data is collected on 11-, 13- and 15-years old boys' and girls' health and well-being, social environments and health behaviours every four years in 43 countries, notably in Switzerland and United States. Some results from the HBSC 2009/2010 survey (Currie & al., 2012) compared the health behaviours and outcomes of Swiss and American youth including moderate-to-vigorous physical activities, sedentary behaviours, and body weight.

2.2.1 Moderate-to-vigorous physical activity

Physical activity is essential for both health outcomes and academic learning improvement. First, physical activity is essential for long- and short-term physical and mental health outcomes. The WHO estimates that 1.9 million deaths worldwide are attributable to physical inactivity and at least 2.6 million deaths are a result of being overweight or obese (WHO, 2002, 2005). In addition, the WHO estimates that physical inactivity causes 10 to 16 % of cases of breast, colon, and rectal cancers as well as type 2 diabetes, and 22 % of coronary heart disease, and the burden of these and other chronic diseases has rapidly increased in recent decades. Physical activity in adolescence may contribute to the development of healthy adult lifestyles, helping reduce chronic disease incidence and increasing well-being in adulthood (Hallal, Victora, Azevedo, & Wells, 2006; Lotan, Merrick, & Cameli, 2005; Malina, 2001; Merrick, Morad, Halperin, & Kandel, 2005; Strong & al., 2005).

Second, studies show that more physically active and fit students have better grades and achievement test scores than their less active/fit counterparts (Coe, Pivarnik, Womack, Reeves, & Malina, 2006; Donnelly & Lambourne, 2011; Field, Diego, & Sanders, 2001; Grissom, 2005). Participation in PE and physical activity can improve academic achievement by enhancing concentration and by helping students to be more attentive (Raviv & Low, 1990).

Strong & al. (2005) recommended that school-age youth should participate daily in 60 minutes or more of moderate to vigorous physical activity (MVPA). In Switzerland (OFSPO, 2013) and in the US, the national recommendations are at least one hour of moderate to vigorous physical activity per day for children and adolescents. In the HBSC

survey (Currie & al., 2012), young people were asked to report the number of days over the past week that they participated in MVPA for a total of at least 60 minutes per day. Results showed physical activity decreased with age in both countries, with the percentages across all age groups in both countries low. Nevertheless, a higher frequency of daily MVPA was found among American than Swiss youth at each age: at 11 years-old, 24 % of American girls versus 11 % of Swiss girls, and 30 % of American boys versus 20 % of Swiss boys reported at least one hour of MVPA daily; at 15 years-old, 17 % of American girls versus 6 % of Swiss girls, and 33 % of American boys versus 12 % of Swiss boys reported at least one hour of MVPA daily (Currie & al., 2012).

2.2.2 Sedentary behaviours

Sedentary behaviour refers to an absence of or minimal involvement in physical activity, and low energy expenditure. A review of recent research revealed television viewing time was the most commonly measured sedentary behaviour. Time spent in non-occupational sedentary behaviours (particularly television viewing time) is associated with excess adiposity and an increased risk of metabolic disorders, with overweight and obesity and unhealthy dietary behaviours in children, adolescents and adults (Pearson & Biddle, 2011; Sugiyama, Healy, Dunstan, Salmon, & Owen, 2008). In the HBSC survey (Currie & al., 2012), young people were asked how many hours per day they watch television (including videos and DVDs) in their spare time on weekdays and on weekends. Results showed that Swiss youth spent less time watching TV than US youth (Currie & al., 2012): at 11 years-old, 24 % of Swiss girls versus 50 % of American girls, and 29 % of Swiss boys versus 56 % of American boys spent two hours or more per day watching TV; at 15 years old, this percentage increased among Swiss youth but it was always lower than among American youth (38 % of Swiss girls versus 53 % of American girls, 45 % of Swiss boys versus 54 % of American boys). In addition, cell phones increase opportunities for sedentary behaviours (e.g., surfing the internet, playing video games). Lepp, Barkley, Sanders, Rebold, and Gates (2013) showed that high levels of cell phone use indicated a broader pattern of sedentary behaviours

such as watching television. Moreover, cell phone use was significantly and negatively related to cardiorespiratory endurance independent of sex, self-efficacy, and percent fat, which were also significant predictors. Buckworth and Nigg (2004) found that only computer use for men and television watching for women were negatively correlated with exercise and physical activity. In the same way, Sugiyama & al. (2008) showed, after adjusting for body mass index and socio-demographic variables, that women's time spent watching TV was positively associated with time in other sedentary behaviours and negatively with leisure-time physical activity, but no such associations were observed in men.

2.2.3 Body weight

Overweight and obesity remain public health problems among young people (Rokholm, Baker, & Sorensen, 2010). Overweight and obesity impose high costs in health expenditure in countries. For example, according to a study of national costs attributed to both overweight and obesity, medical expenses in the US may have reached as high as $78.5 billion (WHO, 2009). The problems of overweight and obesity are higher in the US than in Switzerland: among 11 year-old youth, 5 % of Swiss girls compared to 30 % of Americans girls, and 7 % of Swiss boys compared to 31 % of Americans boys were overweight or obese; among 15-year-old youth, 7 % of Swiss girls compared to 27 % of Americans girls, and 14 % of Swiss boys compared to 34 % of Americans boys were overweight or obese (Currie & al., 2012).

2.3 PE Curriculum Differences Between the State of Vaud in Switzerland and California in US

There are various differences between the PE curriculum in the US and Switzerland including number of hours of PE per week, the evaluation, the number of students per teacher, coeducation, and PE uniforms. Concerning the number of required PE hours, students in Switzerland have three periods (45 minutes) of PE per week and one afternoon of sport every 15 days (only from the third school year). In the US, the standard recommendation

is 200 minutes of PE for every 10 school days in elementary school and 400 minutes for every 10 school days in middle school. However, these recommendations may not be adhered to because of school budget issues, with the teaching of PE reduced or eliminated in schools with the lowest financial resources. During the 2007–2008 school year, time spent in PE in the US decreased by 23 %; elementary schools were the most affected by this problem. In addition, California along with 18 other states, agree to give PE exemption to high school students who wish to be exempted from PE classes if they can meet the "Healthy Fitness Zone" requirements of the Fitnessgram. Thus, 38 % of Californian students do not participate in PE lessons, and this rate increases dramatically with age, from 5 % at age 12 to 77 % at age 17 (CHIS, 2007). This decline with age was observed in California but a decline is also apparent in the entire United States.

There are also major differences between the number of students, sportswear requirements, and organization of students in PE classes in Switzerland and in the US. In Switzerland, the student-teacher ratio is 20:1, and in California the ratio may be as much as 100:1. The number of students per class in PE is the highest in California when compared to the rest of the states in the US. The California Department of Education recommends an average of 40 students per teacher, but in reality, the classes are much larger. For example, during the 2007–2008 school year, PE class size increased 26 %; meanwhile, the number of teachers was reduced 22 %. Thus, in recent years, the number of students in PE classes has constantly increased up to 100 students for one teacher (The California Endowment, 2008). In the US, middle school PE classes always include boys and girls in all classes, but in Switzerland, girls and boys are often separated. Sportswear is required in Swiss PE classes but not always in the US. Some schools have PE uniforms but in other schools the students can participate in PE with street clothes and shoes.

Finally, some differences exist concerning the evaluation in PE. Letter grades are given in PE classes in the US but not in the state of Vaud. In the state of Vaud, the teachers use an evaluation notebook to indicate each year the student's success in activity practiced as well as the possible difficulties in physical activities. The students keep the same evaluation notebook during the three years of the middle school, so the

progress can be directly visible from one year to another. Researchers have found that academic grades influence (positively or negatively) students' achievement (Brookhart & DeVoge, 1999; Brookhart & Durkin, 2003). Assessment in PE can enhance or prevent learning, motivation and achievement (Alkharusi, 2008; Lund & Kirk, 2010). Students' success of failure (in academic contexts) contributes to motivation and self-concept (Marsh & Martin, 2011; Pintrich & Schunk, 2002).

3. Methods

3.1 Sample

Participants included 418 students (ages 12–14 years) from middle schools in Switzerland (n=301) and the US (n=117).

3.2 Tools

Physical fitness was measured using assessments from the *Fitnessgram* (Cooper Institute, 2012). *Fitnessgram* physical fitness measures included cardiovascular endurance (PACER), muscular endurance (curl-ups), muscular strength (push-ups), flexibility (back-saver sit-and-reach), and body composition (Body, Mass Index, BMI). The PACER is a 20-m shuttle run at a specified pace that increases every minute. Results of curl-ups and push-ups were based on the greatest number completed to a cadence. The back-saver sit-and-reach measurement was performed on one side at a time; one leg is fully extended with the foot flat against the face of a box and the arms are extended forward over the measuring scale with hands placed one on top of the other. After one side is measured, the student switches the position of the legs and reaches again. The average of number of inches on each side was used for each student in the analyses.

Questionnaires included the Motivation in Physical Activity Measure-Revised (MPAM-R) (Ryan & al., 1997) and the Physical Self-Description Short Form Questionnaire (PDSQ-S) (Marsh, Martin, & Jackson, 2010). The MPAM-R is composed of 30 items and 5 subscales: interest/enjoyment (7 items), competence (7 items), appearance (6 items), fitness (5 items), and social (5 items) motives (Ryan & al., 1997). Each item is rated on a 7-point Likert scale. Frederick and Ryan (1993) found internal consistency (alphas above 0.87 for each subscale) of the MPAM. The translation of this questionnaire in French language from Laure (2007) has been used. The PDSQ-S evaluated how an individual (middle school students) would describe themselves according to 11 different factors (subscales) (Marsh & al., 2010). The Self-Concept subscales selected for study included endurance (cardiovascular endurance), strength, flexibility, body fat, appearance, and physical satisfaction as there were specific connections to fitness and motivation variables; the coefficient alpha estimates of reliability for these subscales are 0.92, 0.92, 0.90, 0.96, 0.91, and 0.96, respectively (Marsh, 1996). Results from Marsh & al. (2010) demonstrated strong support for the psychometric properties and construct validity of the PDSQ generalizing to the PDSQ-S. The MPAM-R has been validated in the French language by Laure (2007) and the PSDQ-S by Guérin, Marsh, and Famose (2003, 2004), following the steps described in the translating approach for psychological tests developed by Vallerand and Halliwell (1983) and Valliéres and Vallerand (1990).

3.3 Procedure

Data were collected by student teachers during two successive school years (2012–2013, 2013–2014), in the classes of six Swiss student-teachers and two American student teachers. Data were collected at two different time points (with 8–10 weeks in between). For each data collection, all fitness tests and questionnaires were administered during a one-week period alternating fitness testing and questionnaires in order to account for potential fatigue.

3.4 Statistical Analysis

The SPSS Software was used for all analyses and have been categorised by country and gender for fitness, motivation, and self-concept variables. Three 2 x 2 (country x gender) Multivariate Analysis of Variance (MANOVA) procedures to test statistical differences between groups were conducted with follow-up univariate Analysis of Variance (ANOVA) procedures for post-hoc analyses that included a Bonferroni Correction to adjust the alpha level ($\alpha = .01$).

4. Results

Table 1 presents the descriptive statistics for country and gender main effects for each of the dependent variables.

Table 1. PEERS Project 2012–14_Descriptive Statistics for Fitness, Motivation, and Self-Concept Variables.

	Country		*Gender*	
Fitness	*Switzerland*	*United States*	*Female*	*Male*
PACER	45.76 (22.65)*	36.61 (20.69)	32.97 (17.17)	50.22 (20.96)*
Curl-ups	50.35 (26.18)	57.69 (20.39)*	46.31 (25.60)	55.79 (24.08)*
Push-ups	17.26 (12.23)	13.97 (8.77)	12.91 (10.33)	18.67 (11.77)*
Sit-Reach	11.91 (12.85)	12.67 (7.40)	15.45 (11.44)	9.97 (11.47)*
BMI	20.37 (3.39)	20.53 (4.56)	20.59 (3.92)	20.29 (3.57)
Motivation				
Interest/Enjoy	5.02 (1.44)	5.59 (1.28)*	4.71 (1.55)	5.48 (1.23)*
Competence	4.96 (1.42)	5.72 (1.76)*	4.84 (1.46)	5.38 (1.40)*
Appearance	4.61 (1.46)	4.42 (1.66)	4.38 (1.55)	4.68 (1.50)*
Fitness	5.27 (1.35)	5.89 (1.09)*	5.25 (1.31)	5.55 (1.31)*
Social	4.26 (1.27)	4.67 (1.23)*	4.30 (1.31)	4.42 (1.23)

	Country		*Gender*	
Self-Concept	*Switzerland*	*United States*	*Female*	*Male*
Endurance	3.71 (1.33)	4.19 (0.91)*	3.61 (1.20)	4.00 (1.26)*
Strength	3.93 (1.23)	4.38 (0.95)*	3.70 (1.24)	4.28 (1.09)*
Flexibility	3.52 (1.42)	4.75 (1.14)*	3.91 (1.40)	3.79 (1.49)
Body Fat	4.80 (1.73)*	3.48 (1.52)	4.21 (1.77)	4.65 (1.76)
Appearance	3.75 (1.39)*	2.77 (1.52)	3.18 (1.42)	3.71 (1.50)*
Phy. Satisfaction	4.23 (1.24)	4.91 (1.04)*	4.10 (1.42)	4.62 (1.18)*

Note. Mean (Standard Deviation). * $p < .01$.

Wilkes Lambda was selected as the multivariate statistic as there were violations in the normality for all fitness, motivation, and self-concept variables (univariate Kolmogrov-Smirnov < .05). Tabachnick and Fidell (2013) suggest that larger samples and group differences present challenges in normality due to errors in both skewness and kurtosis. To address normality review of expected normal probability plots was also conducted and results suggested minor deviations for group distributions. A bootstrapping procedure was also performed to correct for violations in assumptions homogeneity of variance and after the robust methods procedure (5 % trimmed mean) no violations were present for fitness, motivation, or self-concept variables. Results for the 2 x 2 MANOVA for fitness variables indicated that there were significant main effects for country F (5,681) = 10.648, Wilkes Lambda = .927, $p < .001$ and follow-up univariate ANOVA's determined there were significant differences in the PACER and Curl-ups. Swiss middle school students (45.76) had higher PACER scores than did students in the US (36.61). Curl-ups scores for the US students (57.69) were greater than Swiss students (50.35). There was a significant main effect for gender F (5,681) = 20.181, Wilkes Lambda = .871, $p < .001$ and follow-up ANOVA's determined that males were significantly greater for all fitness variables except BMI. There was also a significant interaction between country and gender F (5,681) = 4.805, Wilkes Lamdba = .966, $p < .001$, as both Swiss and US males (Swiss = 52.89, US = 40.05) were significantly better ($p < .001$) for

cardiovascular endurance than Swiss and US females (Swiss = 32.93, US = 33.07). US males (60.15), Swiss males (54.65), and US females (55.19) had significantly better abdominal endurance scores than Swiss females (42.42). Figure 1 provides a graphical representation of the significant interactions.

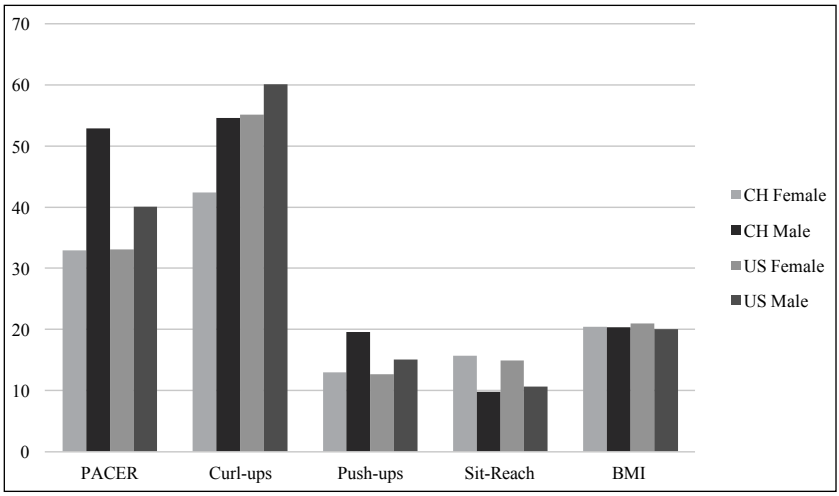

Figure 1: Country * Gender Mean Scores for Fitness Variables.

The 2 x 2 MANOVA for motivation variables indicated that there were significant main effects for country F (5,763) = 19.413, Wilkes Lambda = .887, $p < .001$. Follow-up univariate ANOVA's determine there were significantly higher scores for US students on the interest-enjoyment, competence, fitness, and social sub-scales. American middle school students had higher perception for Interest/Enjoyment, Competence, Fitness, and Social subscales than Swiss middle school students. There was also a significant main effect for gender F (5,763) = 11.348, Wilkes Lambda = .931, $p < .001$ and follow-up ANOVA's determined that males were significantly higher motives for physical activity on interest-enjoyment, competence, appearance, and fitness variables. There was no significant interaction F (5,763) = 2.847, Wilkes Lambda = .982, $p = .015$.

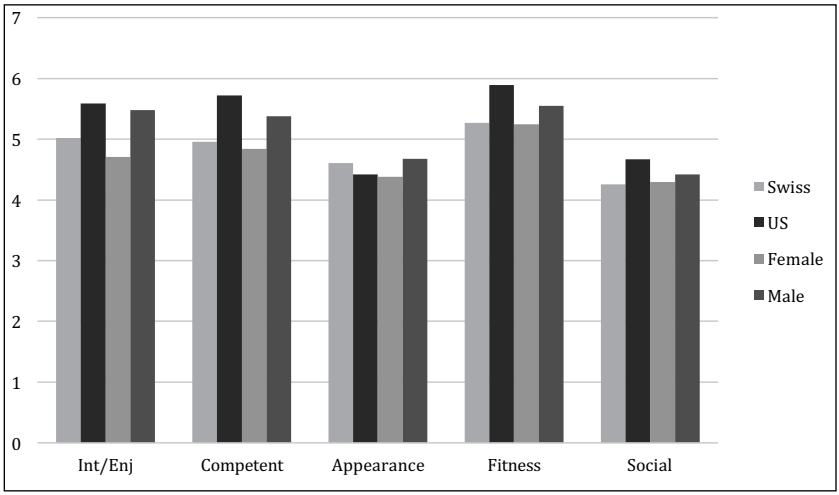

Figure 2: Country & Gender Mean Scores for Motivation Variables.

The 2 x 2 MANOVA for self-concept variables revealed a significant main effect for country F (6,732) = 61.072, Wilkes Lambda = .666, $p < .001$. Middle school students from the US had significantly higher perceptions of cardiovascular endurance ($p < .001$), strength ($p < .001$), flexibility ($p < .001$), and physical satisfaction ($p < .001$) as compared to the Swiss students who had higher scores for body fat ($p < .001$) and appearance ($p < .001$). A significant main effect for gender F (6,732) = 7.629, Wilkes Lambda = .941, $p < .001$ was also present as males had significantly ($p < .01$) higher perceptions of endurance, strength, appearance, and physical satisfaction. Finally, there was a significant interaction F (6,732) = 3.918, Wilkes Lambda = .969, $p < .001$ and follow-up ANOVA's determined significant differences for strength ($p < .001$) and body fat ($p < .01$). US males (4.45), US females (4.32), and Swiss males (4.23) had significantly higher ($p < .01$) perceptions of muscular strength than did Swiss females (3.41). Swiss males (5.00) and Swiss females (4.49) had higher perceptions ($p < .01$) of body fat than did US females (3.63) or US males (3.32). Figure 3 represents the country gender interactions for self-concept variables.

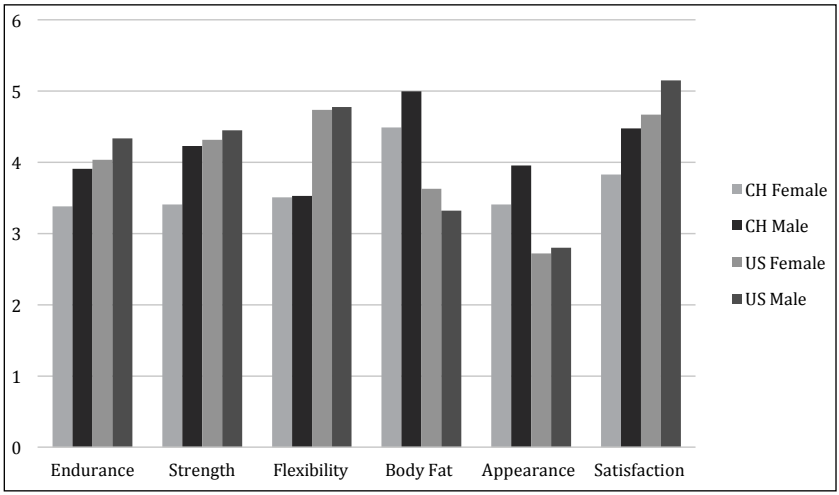

Figure 3: Country * Gender Mean Scores for Self-Concept Variables.

5. Discussion

5.1 Physical fitness among Swiss and American students

We hypothesized that Swiss middle school PE students would have higher fitness levels than US students. This hypothesis was partially supported. No significant differences between the Swiss and US middle school students were found for the push-ups, sit-and-reach, and BMI; however, differences were shown for the PACER scores and curl-up tests. The Swiss students had higher PACER scores than the US students, which supported our hypothesis. Gender differences were also evident. Swiss and US males had higher PACER scores than females in both countries. The US students had higher curl-up scores than the Swiss students, which did not support our hypothesis. US males and females and Swiss males had higher curl-up scores than Swiss females. In this

study, we have used US fitness tests (*Fitnessgram*). US students are more familiar with these tests, and that may explain why our hypothesis is only partially supported.

One possible reason for the differences in cardiovascular endurance is the amount of time students are physically active throughout the day. The current physical activity recommendation for school-age youth is 60 minutes or more of moderate to vigorous physical activity (Strong & al., 2005). However, many children in Switzerland and the US are not meeting that recommendation due to various reasons such as lack of time spent in PE overall, lack of time spent in MVPA in PE, and lack of physical activity outside of PE classes and sports due to other factors such as screen time.

According to results from the current study, it is vital that US and Swiss children are not only physically active, but that those activities should emphasize cardiorespiratory fitness in the US and abdominal/core training in Switzerland. Successful cardiorespiratory fitness programs typically have involved continuous moderate to vigorous activities for 30 to 45 minutes duration for three to five days per week (Strong & al., 2005). Swiss PE teachers should also incorporate more abdominal/core training two to three times per week in PE classes.

Ideally, students should participate in PE classes every day. However, this is rarely the case due to school budgets and limited resources. Therefore, PE teachers should make an efficient use of the time students spend in PE classes by ensuring students spend the majority of the class period in MVPA. Girls should be especially encouraged to participate; research has shown that on average, girls spent an average of only 37.9 % of PE classes engaged in MVPA (McKenzie & al., 2006). McKenzie & al. (2006) found that PE programs that include the provision of equipment, staff training, a teaching assistant, and an updated curriculum can be successfully implemented in US middle schools to ensure that participants spend at least 50 % of the class engaged in MVPA.

5.2 Physical activity motivation among Swiss and American students

We hypothesized that Swiss middle school PE students would have greater physical activity motivation than US students. The hypothesis was not supported, as results showed the US students had significantly higher scores on the interest-enjoyment, competence, fitness, and social subscales than the Swiss students. Gender differences were also apparent; results showed males had significantly higher motives for physical activity on interest-enjoyment, competence, appearance, and fitness variables.

Overall, the motivation for physical activity of students in general was high, and results support previous research that emphasized youth are motivated to be physical active for multiple reasons such as enjoyment, competence, fitness, and to socialize with/to meet friends (Ewing & Seefeldt, 1996). In their review of the correlates of physical activity and sedentariness in youth, Van der Horst, Paw, Twisk, and Mechelen (2007) revealed similar positive associations were found; specifically associations between physical activity participation and gender (male), self-efficacy, goal orientation/motivation, and physical education/school sports. PE teachers (especially in Switzerland) should focus on creating a positive motivational climate and structure classes to encourage fun and skill building, increase fitness levels, and allow for positive social interactions. The lower motivation scores may be explained by the assessment modalities in PE. The first results of a current comparative study in three states of Switzerland (Vaud, Jura, Geneva) showed that the students' intrinsic motivation scores in PE were lower in the state of Vaud (PE without grades) compared to the state of Jura (PE with non-summative grades) and Geneva (PE with summative grades; Allain, Deriaz, Voisard, & Lentillon-Kaestner, 2015). Additional considerations should also be taken to ensure girls are physically active throughout the class period in both the US and Switzerland.

5.3 Physical activity motivation among Swiss and American students

We hypothesized that Swiss middle school PE students would have greater self-concept than US students. This hypothesis was partially

supported. Swiss students had significantly higher scores for body fat and appearance than US students; however, US students had significantly higher perceptions of endurance, strength, flexibility, and physical satisfaction compared to the US students. When compared with the actual fitness results, these results showed a conflict with the perceived fitness variables. Although US students perceived their endurance to be higher than the Swiss students, the PACER scores showed the opposite. Although not significant, the mean BMI for the Swiss students was slightly below the mean BMI for the US students; however, the Swiss students had higher perceptions of body fat than US students. In Switzerland, the PE teachers' expectations may be too high, having negative effects on Swiss students' physical self-concept.

Gender differences in self-concept were also revealed. US males and females and Swiss males had significantly higher perceptions of muscular strength than Swiss females. It is common for males to have a higher perception of muscular strength than females, due to actual changes that are occurring. During the middle school years, males and females may be entering puberty, and in adolescence boys gain additional muscle mass while girls gain more fat than muscle compared to boys (Haywood & Getchell, 2014). Middle school is also a period of time when social evaluation by peers becomes more important than in early childhood.

Both Swiss males and females had higher perceptions of body fat than US males and females. Body image disturbances are common among children, oftentimes even if the child has a healthy body composition (Smolak & Thompson, 2009). PE teachers should educate students about a healthy body composition, and ensure they are structuring classes and giving positive feedback to emphasize a healthy body image.

5.4 Limitations and perspectives

There were several limitations of this study. First, BMI data were calculated using self-reported height and weight measurements of the

participants. Future research should include other means of measuring body composition.

Second, samples for this study were drawn from limited schools and only middle school children were included. The US sample was different from the Swiss sample (less school, less students). Therefore, results may not be generalizable to other areas of Switzerland and the United States or other grade levels. Future research should include other areas of the countries and additional grade levels for a more holistic look at the current issues.

Future research should also include examining additional demographic variables such as race/ethnicity and socioeconomic status, as research suggests there are differences in fitness and self-concept among individuals from different race/ethnicities and socioeconomic statuses (Pate, Mitchell, Byun, & Dowda, 2011).

Finally, there was not an attempt to measure or explain cultural factors that might have influenced results between the Swiss and US samples. There were differences in class sizes, cultural norms, physical education curriculum delivery, and learning expectations. Additional efforts should be made to measure and collect data on variables that contribute to cultural differences. Participants included students from middle schools PE classes with various PE teachers and PE student-teachers in both countries. Future research should also include classes taught solely by a PE teacher. The influence of the teacher on a student's fitness, motivation, and self-concept is also another variable that would be beneficial to measure.

6. Conclusion

In conclusion, there are both country and gender differences between middle school students in PE programs in the United States and Switzerland. The information gained from this study can benefit PE programs in both countries. PE teachers in Switzerland should not be

too exigent on students' physical condition level and increase enjoyment and competence in sport and exercise practice. PE teachers in the US should help students to improve their cardiorespiratory endurance and be vigilant on negative appearance remarks. Nevertheless, further studies on larger samples should be carried out to confirm these results. In addition, beyond the research project, this international collaboration has allowed both teacher educators and students to discover other PE teaching practices, other PE teaching conceptions, which has been highly beneficial for their professional development.

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Chapter 14: Intercultural Competence and Teaching Diverse Learners

Abstract
Pre-service science teachers from the USA and Switzerland work in a collaborative inquiry team to explore effective methods for engaging diverse pupils. Participants construct, teach and refine one lesson over the course of six cycles; each cycle involves one participant teaching the lesson in one school serving diverse learners. During lesson instruction, other team members collect pre-determined data on student engagement and comprehension. Research on participants explores how involvement in this project affects intercultural and instructional competencies. Data suggest that individual participants experience a shift in thinking from traditional teacher-centered ideals to a more student-centered approach. Planned group actions (i.e. instructional strategies) mirror this shift as lessons become progressively more student-centered. Post-project participants describe the importance of connecting lessons to students' lives and culture, a consideration not made prior to the program. A focus on international collaboration and marginalized pupils has provided insight into the development of teaching and intercultural competencies of pre-service science teachers.

1. Project Rationale

Aligned with the purpose of PEERS, to create a global community of culturally competent teachers prepared to confront the challenges of educating in diverse societies, the HEP/HSU PEERS Science Project

seeks to provide preservice teachers with opportunities to understand effective methods for meeting the needs of diverse learners.

The beliefs that teachers hold may directly affect their practice; including their expectations of students and the way they design learning opportunities (Mansour 2009, Pajares 1992, Hashweh 1996). Teacher beliefs develop through years of observation of teaching, as students themselves, immersed in the context of their microcosm of American or Swiss culture. For example, if they are raised in an area where Native Americans on the local reservation are thought to be drunk, violent, and on the government dole, or if there are views that immigrants do not contribute positively to society. Such beliefs may affect what they believe Native students or immigrants in their classroom can do (Mansour 2009, Shulman 1987, Lortie 1975). Teacher beliefs about their students and school are often developed prior to teacher training and have been shown to be resistant to change or influence. Often an idealism and openness to teaching approaches not observed throughout a lifetime of schooling emerges during university teacher preparation, only to disappear when the complex environment of the first years of teaching are encountered (Zeichner and Tabachnick, 1981). Pre-service teachers in their courses focus on theoretical knowledge, teaching methods, and classroom practice that have been shown to better impact student understanding. But, new practicing teachers either stick with or revert back to what they have seen as students themselves, unable to realign their entrenched beliefs about school and the classroom with the new knowledge that their teacher preparation courses have provided (Mansour 2009).

Teacher-centered instruction in which the teacher is the authority and the students are passive recipients of knowledge is not as effective at providing opportunities to learn beyond memorization as student centered instruction, where students are active seekers of knowledge and the teacher is the facilitator (Anderson 1997, Darling-Hammond 1996). Pre-service teachers may "know" student centered instruction is superior from their teacher preparation programs, but do not implement it or they try and then abandon this type of teaching during their first years of practice (Simmons & al. 1999, Leuhmann 2007, Felix & Saujat 2007).

In a comprehensive study involving nine teacher training institutions, and following 116 new science and math teachers for their first three years of teaching, Simmons and colleagues suggested two reasons for this state of affairs in teacher education: 1) the adult centered culture of schools is too strong (i.e. lack of support for student centered teaching among administration and faculty, new teachers have little experience or knowledge of this practice to "defend" it, and new teachers do not see it in practice in schools) and 2) the lack of multiple and meaningful opportunities to practice and experience student centered teaching or learning in their teacher training programs. Pre-service teachers may only hear or read about student-centered instruction in their teacher preparation programs, never practicing it nor experiencing it themselves. Leuhmann (2007) also found that pre-service science teachers who have not had meaningful experiences with reform-based teaching (i.e. participation in and practice with inquiry learning and teaching which is student-centered, rather than gaining understanding from a textbook or lecture) are "likely to lack buy-in" and confidence in their abilities to enact this type of teaching, reducing the probability that they will be used. The "interlacing" between the techniques of management and the pedagogic necessities are one of the main characteristics of a teacher's job, and negotiating these are often difficult, resulting in some loss of fidelity (Felix & Saujat 2008).

Understanding these realities, we created a PEERS project for pre-service teachers to develop a strong understanding of student centered teaching and its effects on youth. Additionally we wanted to provide opportunities for pre-service teachers to confront their ideas and beliefs about diverse students and explore how to better address their needs, specifically. The following ideas guided the creation of the HEP/HSU Science Project for pre-service teachers: 1) beliefs about teaching are entrenched in pre-service teachers and develop from their own prior schooling experiences (Zeichner & al. 1987, Lortie 1975); 2) people can change their ideas from contrary experiences, or when confronted in a salient manner, with contrary evidence regarding their existing beliefs (Nespor 1987, Pajares 1992, Marx and Moss 2001); 3) collaborative inquiry into teaching provides an opportunity to gather and reflect on

data about student understanding and may assist pre-service teachers' examination and alteration of their existing beliefs (Fendandez 2010, Ricks 2011); 4) asking an international collaborative inquiry group of pre-service teachers to focus on creating a lesson to meet the needs of diverse and marginalized learners may encourage the group to confront their ideas, perceptions, and beliefs about diverse learners and teaching (particularly teacher-centered instruction) in general (Fernandez 2010, Bryan and Atwater 2002); and 5) providing multiple opportunities for the group of student teachers to teach in diverse and culturally unfamiliar settings may assist pre-service teachers in developing new lenses through which they can confront their ideas and perceptions about "others" (Marx and Moss 2001, Bryan and Atwater 2002), particularly when they plan, teach and reflect in an international group.

Furthermore, knowing that beliefs about teaching are central to the practice of teaching, yet are entrenched in a foundation of "doing school" in a teacher centered manner, we wanted, as teacher educators, to affect change in these beliefs to an approach that may be better for youth who are students in the diverse secondary schools of the United States and Switzerland.

The HEP/HSU Science Project involves an international collaboration between pre-service teachers using an inquiry approach (i.e. reflective, collaborative, and investigative) based on the Lesson Study model. Lesson Study is a professional development model used widely in Japan that provides an opportunity for collaborative and individual reflection about the practice of teaching through the collaborative study of one lesson. Lesson Study participants are active in planning a lesson, collecting and analyzing data from the lesson observations, and refining the lesson based on group reflection. Multiple perspectives are likely to be present when this is internationalized, creating rich opportunities for reflection.

2. Project Description and Participants

Three science undergraduates interested in teaching from HSU and three science student teachers from HEP are grouped and given the task to create one lesson on a particular topic: invasive species, genetics or climate change. Guidelines are established that the lesson must especially engage marginalized learners (i.e. those traditionally ostracized by the school system such as Native American students in the U.S. or political refugees from Africa or Kosovo or general immigrants in Switzerland). Furthermore, the inquiry team of pre-service teachers must collect data from high school pupils about their understanding of the topic focusing the lesson and their engagement in the lesson.

Using these guidelines, the team collaboratively plans a lesson, including evidence that will be collected during the lesson, to determine student understanding and engagement. One member then teaches the lesson, while the others collect data about student understanding and engagement. After the lesson, the group members analyze the data together and use it to refine the lesson to further meet the goals of increasing student understanding of the topic and providing opportunities to increase the participation and interest of all students, especially marginalized learners.

Each member of the team then teaches the lesson once. The lesson is taught six times to six different classes in approximately four different schools. Three of the lessons are taught in the U.S. and three in Switzerland. The Swiss pre-service teachers travel to the U.S. to observe lessons in the fall and the U.S. pre-service teachers travel to Switzerland in the spring. Care is taken to choose schools in both countries where traditionally marginalized pupils attend. Varied classrooms were utilized: one where the students are all non-native speakers of the respective language (i.e. French), another in which a high percentage of students are classified as learning disabled, a third where a high percentage of students live in communities that have experienced cultural trauma (i.e. Native Americans), and also one with a high percentage of students who are immigrants.

Table 1: Project Timeline.

	Time	*Description*
Planning Meeting	Summer	Supervisors meet face-to-face and plan program domain of exploration and learning tasks
Pre-service Student Selection	Late Summer/ Early Fall	Select students using interviews
Pre-service Student Contact (Online)	Early Fall	Using Skype, google.chat, email and Facebook to plan lesson
HEP to HSU	Late Fall/Early Winter	Observe in U.S. schools, plan and teach and refine lesson
Pre-service Student Contact (Online)	Winter	Using Skype, google.chat, email and Facebook to refine lesson
HSU to HEP	Spring	Observe in Swiss schools, plan and teach and refine lesson
Pre-service Student Contact (Online)	Late Spring	Using Skype, google.chat, email and Facebook to write student report

3. Faculty Research Question

Faculty research centers on the question: How does participation in the PEERS Project impact intercultural and instructional competencies, especially related to meeting the needs of diverse learners? Given the mission of the overall PEERS program to build a global community of culturally competent teachers, understanding how the project impacts the thinking of pre-service teachers in relation to these outcomes seemed pertinent. At the time of this writing, three PEERS groups had completed the HEP/HSU Science project. These groups were labeled A, B and C and group A was the first group to participate.

Several data sets have been used to measure intercultural and instructional competencies. These include individual interviews, the Draw-a-Science-Teacher-Test (DASTT), completion of a Teaching Scenario, and faculty observation of collaborative meetings, lesson implementation and group presentations.

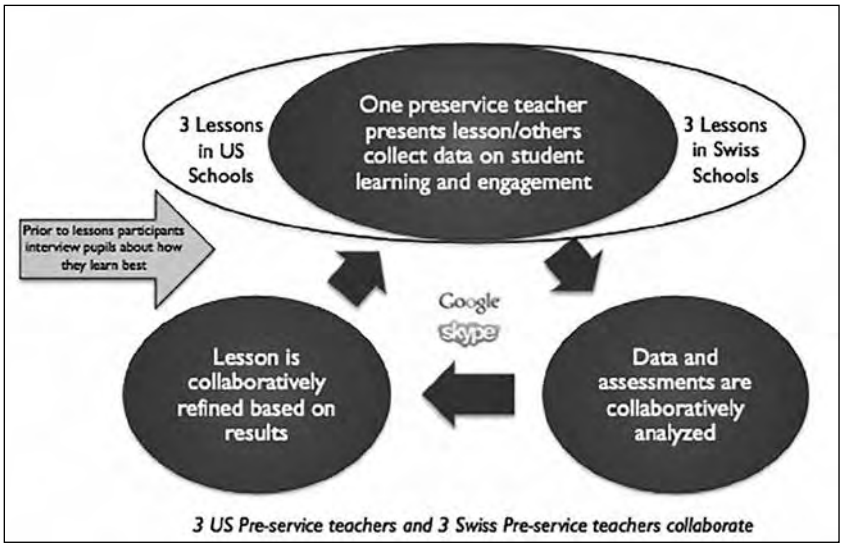

Figure 1: HEP/HSU Science Project Participant Organization.

4. Methods

Multiple data sets are used to measure and observe the instructional and intercultural competency of the participants. As participants plan, collaborate and discuss their lesson we observe their meetings, taking field notes of key conversations and decisions. Several documents are requested from the group including lesson plans and instructional materials. Each lesson taught in U.S. or Swiss schools is observed and

recorded through field notes by at least one faculty advisor, if not both. Additionally participants give a final presentation summarizing their learning to a Swiss university level science instructional methods class. Field notes are taken during the presentation and for Groups B and C this presentation was recorded.

Each participant is interviewed three times. Interview questions center on group process, ideas about the meanings and impacts of intercultural competency and perspectives and beliefs related to instructional methods for diverse learners. Interviews occur pre-program, mid-program after the Swiss to U.S. exchange but prior to the U.S. to Switzerland exchange and post-program, upon completion of all activities.

Two additional methods are used to monitor ideas about teacher-centered versus student-centered beliefs. In the first, participants are asked to read a scenario about lesson planning. Participants are asked to answer a question in writing about how they would approach the situation. This assessment occurred in Group C only, at pre-program and post-program times. Second, a method developed and utilized in several studies to investigate pre-service teacher beliefs of teacher vs. student centeredness is used (Thomas & al. 2001, Markic and Eilks, 2010). Participants are asked to "Draw a typical day of teaching in your future." To control for varied artistic flair and/or abstract representations, participants are also asked to write a short description of what the students are doing and what the teacher is doing. HEP/HSU Science Groups B and C completed these drawings prior to program participation and upon program completion.

Table 2: Data Sets and Alignment to PEERS Group.

Group	*Interviews and Observations*	*DASTT*	*Scenario*
	Measured Attribute:		
	1. Instructional Competence 2. Intercultural Competence	1. Instructional Competence	1. Instructional Competence
	When Measured:		
A (2011–12)	Pre-Mid-Post		
B (2012–13)	Pre-Mid-Post	Pre-Post	
C (2013–14)	Pre-Mid-Post	Pre-Post	Pre-Post

5. Results

Data trends across each data set indicate increased intercultural and instructional competencies. Interview data revealed thoughts about how to meet the needs of diverse learners.

Participants in Group A described this in the following manner:

> The ways that students learn are affected by their culture. We need to find ways to make lessons relevant to the students life and cultural experiences.
>
> Different sets of students need different methods.
>
> We need to assess and incorporate the prior knowledge and life of students.

Group B also expressed specific ideas related to how to meet the needs of diverse learners:

> If you want to teach something you must do it in a way that students connect to it […] who they are needs to be considered.

> The teacher needs not to be at the center of the lesson. I need to step back and let the students learn independently.
>
> Let the students make mistakes, from them they learn better. They need to figure it our for themselves.

Group C's learning seemed to focus on relevance and emotional safety, in regards to diverse learners. One participant summarized this in a particularly salient manner during the final presentation:

> I think one of the main things that I learned was how necessary it was to have a relationship with your students and make your classroom a safe space, especially for marginalized learners who may not feel safe or accepted in society as a whole. A lot of times in classrooms that dynamic can sort of be mirrored so a marginalized learner may come into that classroom and may still not feel accepted. They may not feel like they belong there or that they can't relate to their teacher or that their teacher cannot understand them and doesn't know what they need. For me being able to talk to your students and communicate with them and find what this individual needs to be able to succeed was really important. I noticed that when we began this project that we had this idea about teaching, as if it was about us deciding what they needed to learn what we wanted to tell them and what we wanted to get from it, but by the end of it I started to think maybe it's more important to let them decide how this is useful to them. And to empower them and let them shape the direction of their learning. I don't know that we did a good job of that in this project, but I think we were starting to understand that more.

The participants in each group also discussed their intercultural competence, both related to diverse learners in their classrooms and their experiences with their international teaching peers.

Participants from Group A noted the following in regards to language learners in schools:

> When I observed the lessons in French I realized I don't get any of it and this would be horrible! It made me think of English learners in classrooms. This is very crucial; you must go out of your way to understand if the students are taking in the information.

Group A participants also reported initially being unsure how to "*start conversations*" with the participants from the exchange, with one participant noting that "*Communication initially was a struggle for me. I*

was afraid of offending the others. Then I realized we all have the same goal." This same participant later reported that the program "*changed my mind about being scared of working with different people. I realized they were just like me.*"

Group B noted learning from each other:

> The (other PEERS) students were more concerned about cultural issues in the classroom. This was constructive for me because they saw certain things I could not see about my students and now I see them.

Participants in Group B also related intercultural competence to their teaching:

> I need to make sure the material can be connected to students and their culture, so I will have to understand what those cultures are and make sure they can come in and be engaged with the material.

Participants in Group C were specifically focused on making content relevant to student's lives and culture:

> We need to make the scientific content related to the reality of the pupils like a game of life.

The DASTT provided insight into the images of teaching the participants held pre and post project. In general, the lower the score on a scale of 1–13 the more student-centered the drawing was considered. The average pre-program score (n=9) was 8.7 and the average post-program score was 2.8 (n=12) (see Figure 3). Figure 2 illustrates typical changes seen over time in one participant's images (Group B). The pre-program drawing is also typical of those seen across groups: the teacher being the active part of the image and at the front of the room while the students are seated and listening. The pre-program drawing (Figure 2) scored 10 and showed the teacher standing in front of the class reading from a book. Students were seated in desks in a rounded row, listening, with several students raising their hands.

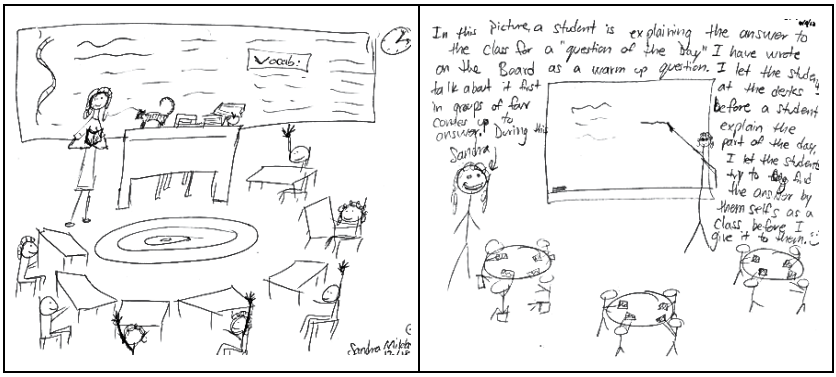

Figure 2: Pre-PEERS Drawing (Score 10) and Post-PEERS Drawing (Score 3).

This drawing would be classified as teacher-centered using the scoring rubric developed by Thomas and colleagues (2001). The post-program drawing scored a 3 on the Thomas & al. rubric and showed the teacher standing to the side of the room and seated students (grouped at tables) listening to a student explaining a concept at the front of the class.

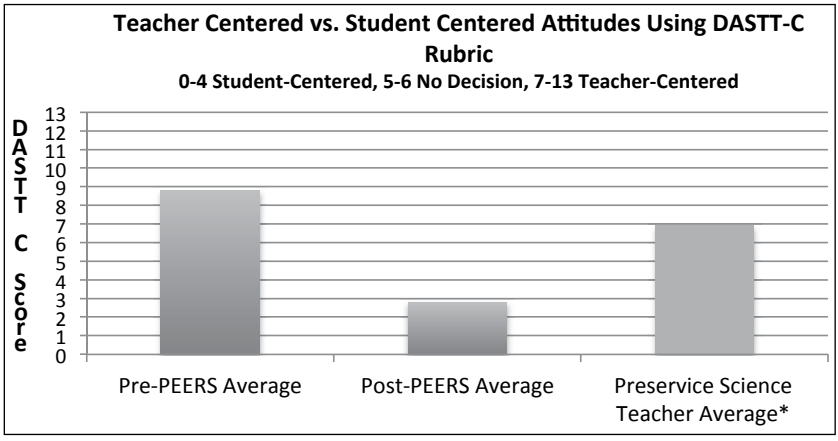

Figure 3: Pre and Post PEERS Average Scores.

**Pre-service science teacher average scores (n=200) from Markic and Eilks 2010.*

Lesson observations showed that the first lessons of all of the groups were focused on the teacher talking and providing information through a Powerpoint, the students spending a large percentage of the instructional time listening and the opportunities to learn and be assessed being focused mostly on student writing answers to questions. The first lessons often attempted to cover a tremendous amount of factual information.

The final lessons were diverse. In Group A the final lesson was a short Powerpoint interspersed with opportunities for students to discuss their preconceptions and develop their definition of an invasive species in cultural relevant ways. The final learning opportunity and assessment asked students in groups of 2–3 to create an invasive species (i.e. drawing) and define it's characteristics in writing.

Group B's final lesson involved embedded questions in a Powerpoint that required students to converse with their partner then write their own answer and finally discuss as a class. Students then completed a puzzle activity and created a labeled diagram to demonstrate their understanding.

Group C's final lesson involved the students solving a mystery using clues using a game format. Pupils were grouped in sets of 2–3 and were given different clues to a related mystery (i.e. climate change), becoming experts on their particular scenario. The teacher gave a short introduction to the lesson and then moved from group to group asking questions. At the end of the lesson each "expert" group of pupils held a "conference" and reported their findings as a class.

Across the groups, lesson progressions showed reduced teacher talk and more student interaction. Additionally, student interaction became more diverse, moving from 1–2 students asking and answering questions to all students answering questions or participating in the lesson in multiple modalities (i.e. speaking, writing, kinesthetic, critical thinking etc.). Figure 4 summarizes these changes for Group B.

A Teaching Scenario was proposed to the participants of Group C pre, mid and post program. Participants were asked to note the questions they would ask themselves prior to lesson planning and to briefly outline the learning tasks they would plan. Prior to PEERS participant the questions the participants asked themselves focused on how much time they had

to teach, what background knowledge the students had and what could be done by the instructor experimentally to pique interest. Post program participation the questions centered around what the students would want to know about the topic, how the topic could be made relevant to student lives, "what obstacles to learning" there might be, how the students could apply the content and what the students already knew about the topic that could be connected to the lesson.

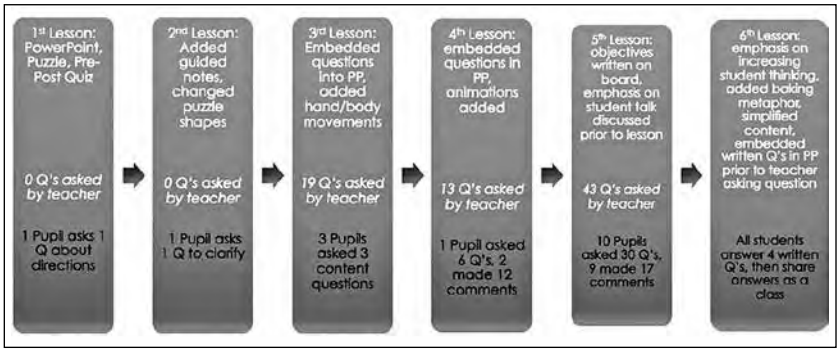

Figure 4: Faculty observation results of PEERS Group B Lesson Progression Over Time with corresponding data on pupil response.

Pre-program lesson outlines all included a lecture ("the teacher would give a lecture for half a class period"). There were some ideas about utilizing an activity or a demonstration ("prepare a short experiment – 2–5 minutes – with a chemical reaction with an ezyme to the same reaction without the enzyme") but the amount of time they were planned, in general, was shorter than the amount of time planned for lecture. Post-program responses focused on the students being active. For example one participant noted he would "Hand off the work to the students, let them accomplish something". Another noted she would plan "applied student projects" followed by a "presentation extravaganza/festival of learning".

6. Conclusion

The objective of the PEERS Science Project is to prepare preservice teachers to better meet the needs of diverse learners. We believe the best methods to make science content accessible to all learners is to provide opportunities to learn which are explicitly relevant to student's lives and culture and that allow students to construct their own understanding; making meaning of science content in context (Zeichner 1993, Ladson-Billings 1993).

In relation to teaching competency, Pre-PEERS trends across Groups A, B and C suggested that the participants held beliefs about teaching in which the teacher is at the center of instruction and "presents" the content to the class. The students' role is to listen and accept the material. Pre-program interviews, DASTT-C drawings, the Teaching Scenario and lesson observations all provided evidence that the participants, in general, understood and believed that teaching was something that was done to students. During the program we witnessed all three groups (A, B and C) struggling with this conception. Their early lessons indicated, through the data they collected and our observations confirmed this, there was little learning occuring among the public school students who were also not uniformily engaged. When the PEERS participants would plan and try another method, such as inserting a discussion in which all students were expected to contribute rather than a lecture (PEERS Group B), they experienced overall increased pupil engagement and content understanding. When they focused the lesson on culture or place (e.g. PEERS Group A decided to use local and culturally important examples of invasive species that students knew) they found that there was more widespread participation. The group also found that when they gave the students freedom to express their own ideas that they themselves learned about their students in important ways (e.g. Native American students clearly demonstrated that they saw invasive species as negative and often gave them human-like characteristics while the immigrants to Switzerland made connections that invasive species could have positive effects and connected this to their immigrant experience).

The realization, that pupils work could reflect their cultural experiences, was a powerful one for PEERS Group A. Discovering that students bring their culture and experience to their work at school, and that providing an opportunity for the pupils to express this increased learning and engagement, was important to Group A. All members of this group indicated thereafter that learning must be connected to culture and place noting that the "*ways that students learn are affected by their culture*" and that they "*must find ways to make it relevant to their life and cultural experiences*". These key learnings and experiences indicated not only a clearer understanding of the importance of student centered experiences, but an increased understanding of how to meet the needs of diverse learners through incorporating opportunties for pupils to connect with the content in culturally relevant ways.

Each PEERS group (A, B and C) planned lessons that progressed over time from teacher centered lectures to more student centered approaches, indicating that participants were coming to understand that placing the students at the center of instruction increased learning and engagement. This conclusion was also supported in data from the DASTT-C, which showed scores descreasing over time. Most pre-program drawings showed a classroom set-up with the teacher at the center of the drawing. Some final drawings showed dramatic differences. Two participants moved the classroom environment to outside of the school, on the beach or in the forest. They indicated in their explanation that students needed to apply their learning in a real context and that the teacher was there to facilitate, not direct. This implied that not only were participants seeing themselves more as a facilitator, but also that learning should be applied in context.

Drawings also provided evidence that Group A, B and C particpants had begun to imagine that students' family, culture and ethnicity should be included in their vision of teaching. For example, one participant's final drawing included "foundations" of teaching at the bottom of the drawing. She envisioned these foundations as students' "interests, home, family, values, ideas, morals, (and) experiences". Her first drawing did not depict student interests, rather it portrayed the knowledge to be learned as being directed by the teacher.

Not all data showed that participants moved completely into the realm of student-centered ideals. Although all drawings over time decreased in score, indicating a shift in beliefs about who is the director of knowledge in the classroom, some did so more dramatically than others. This individual movement, or lack of it, was also found in other data trends such as interviews and lesson observations. Some participants seemed to hold more surface level beliefs about putting students at the center of instruction or how to maintain relationships with diverse students. For instance, some interview data suggested that the participant felt that student-centered teaching was important, but their drawing still indicated that the teacher was the director of knowledge and learning. Additionally, some participants heard and participated in group understandings, but individually struggled to internalize them. It seemed for some of the participants that they were wavering in their ideas, depending on the data source. One participant heard the others discussing the importance of student-teacher relationships and creating a comfortable environment for all students, especially margninalized learners, yet he seemed uncomfortable expressing this view himself. Additionally, he struggled to conceptualize what that might look like and, after teaching his lesson, admitted that perhaps his discomfort affected the student outcomes. While this may be an important learning in itself it provides insight into the internal struggle that new teachers often feel between what they know works (in this case connecting with students) and what they are currently capable of. Over time participants in the PEERS project demonstrated different levels of growth in terms of intercultural competency and teaching competencies.

In relation to cultural competency between US and Swiss counterparts, the idea of "others" seemed to shift, particularly among the US participants. US students reported that early in the collaboration they were afraid to "offend" Swiss group members. Talk within the groups was sometimes tentative or guarded, with missteps in communication that needed faculty mediation. Some US participants expressed exasperation as they struggled to understand the direct communication style of their Swiss counterparts. Swiss participants reported frustration and surprise at the effort group communication required. However, over

time as the groups collaborated on a common goal and continuously reflected, participants became more at ease with each other. One US participant noted that the project "*changed my mind about being scared of working with different people. I realized they were just like me.*" All groups were able to work through their differences and reported the desire for continued collaboration with their international counterparts. Some participants noted that the different perspectives on addressing the challenges of teaching were important and also necessary for meaningful solutions.

Overall the PEERS Science Project collaboration between the University of Teacher Education of State of Vaud and Humboldt State University was effective at providing opportunities for pre-service teachers to learn effective methods for instructing diverse learners and interacting with diverse people. Data repeatedly showed that participants were increasingly more student-centered in their beliefs and in their actions (Table 3), working to allow pupils to make meaning of content in ways that made sense to them (i.e. culturally relevant or applied in context or both). Additionally, participants seemed to shift, albeit at different levels, their understanding of teaching and interacting with diverse people, both pupils and peers. Data suggested (Table 3) that participants were more understanding of what it was like to be a language learner, why cultural connections in curriculum was important and that strong relationships and safe classrooms were key to providing opportunities to learn for diverse people. Their lesson progressions also showed their attempts to put these beliefs into action. All participants recognized that the PEERS project was important part of their professional and personal journey. As one early PEERS Science participant simply noted in her final interview "*PEERS changed my life*."

Table 3: Post-Program Data Trends Over Three-Years.

Group	*Interview and Observation*	*DASTT-C*	*Scenario*
A	Students report: • Understanding that learning is affected by culture • A reduced fear of working with diverse people • Empathy for language learners • Learning strategies to engage diverse learners **Conclusions** Increased intercultural and instructional competencies	*Not administered*	*Not administered*
Group	*Interview and Observation*	*DASTT-C*	*Scenario*
B	Students report: • Lessons need to be connected to pupils lives • Simplicity of a lesson is not reduction of learning • More learning occurs when pupils are independent and active **Conclusions** Increased intercultural and instructional competencies	Scores decreased for all participants Mental-models of teaching more student-centered	*Not administered*

Group	*Interview and Observation*	*DASTT-C*	*Scenario*
C	Students report: • Lessons must be relevant to students place and life • Lesson objectives must be clearly understood by teacher and students • Must make classroom a safe and comfortable space • More student engagement equals more learning	Scores decreased for all participants	Pre-program tasks focused on teacher speaking, post tasks focused on active students
	Conclusions		
	Increased intercultural and instructional competencies	Mental-models of teaching more student-centered	Planning became more student centered

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Chapter 15: Teaching Urban Ecology in Schools in Switzerland and the United States: Considering the Design of an Ecodistrict

Abstract
This PEERS Project involved faculty members and students from HEP Vaud and Lesley University during the academic year 2011–12. Due to the very different profiles of the participating students, the project was designed as follows: the Swiss students developed an interdisciplinary teaching unit focused on the topic of Ecodistricts and taught it to their senior high school students in Geography and Biology. The American students worked on an adaptation of this teaching unit for much younger pupils (2nd grade and 4/5th grades). Both teams also developed teacher's guides for their units. Highlights of the collaboration were the discussions about the students' different visions of sustainable development, urban ecology, and ecodistricts, and about the educational and methodological approaches of teaching education for sustainable development with younger pupils or high school students. The chapter gives an overview of both teaching units' main features and of the benefits and challenges of the collaboration.

1. Introduction and Context

Due to its interdisciplinary nature, the topic of urban ecology offers broad opportunities as part of teacher training, since it has to be approached via methods that derive as much from the natural sciences as from the human and social sciences, all while taking into account the implicit or explicit value systems that underpin the area's different epistemological concepts

(Audigier, Fink, Freudiger & Haeberli, 2011). Working on a topic within urban ecology also adheres strongly to a trend that has characterized curricula for over two decades: the growing importance accorded to learning objectives that respond to social demands by highlighting the educational dimension of studies, and the social issues considered to be a priority (Vergnolle Mainar, 2011), while remaining mindful of the expectations of the world of work (Hertig, 2017). Teaching urban ecology in the context of schools may for example be situated in the context of Education for Sustainable Development (ESD), but this is not the only path. No matter how it is presented, covering such a topic, which is both interdisciplinary and linked to sensitive social issues, requires demanding teaching considerations that represent a serious challenge for student teachers in the early part of their training. A challenge that the students involved in this PEERS project dealt with in a remarkable way, by focusing their work on a single aspect of urban ecology, the design of an ecodistrict. As urban ecology is a very broad and complex scientific field, it was not possible to come up with a teaching-learning unit that could cover all its aspects. A decision was therefore made to focus on the issues linked to the design necessary for developing an ecodistrict – a topic that allowed notably for fieldwork to be included in the teaching unit, and which also allowed for a very interesting comparison of the student teachers' views of urban ecology and the relationship between man and nature.

This chapter looks at one of the projects that ran during the first year of the PEERS program (academic year 2011–12). Atypical in many ways, this project brought together students and professors from Lesley University (Cambridge, Massachusetts) and the Haute Ecole Pédagogique du Canton de Vaud (The State of Vaud University of Teacher Education, HEP Vaud), and led to outcomes that were interesting from a range of perspectives, beginning with the challenge represented by a collaboration instigated between students training to teach pupils of very different ages. The Americans were training to teach elementary school pupils in Environmental Studies, while the Swiss students both held Masters degrees and were training to teach high school pupils. This major difference between the study focus of the students involved was

one of the atypical factors of the project. Other aspects of the context are briefly presented later in the chapter.

The topic of urban ecology was proposed by David Morimoto, Associate Professor at Lesley University (LU), during a meeting with the originators of the PEERS project in early summer 2011. In October, however, David Morimoto announced that he would have to step down from the project due to organizational reasons at LU, even though it had already begun (with student recruitment, initial contact between professors, airline bookings for students, and development of a schedule for the visit of the Swiss partners to LU). In addition, due to unavoidable circumstances, the two HEP trainers involved in the project were unable to accompany their students to Cambridge. Combined with David Morimoto's withdrawal from the project, these circumstances nearly led to the project being abandoned.

It was however kept going through an agreement between parties at the two institutions: David Morimoto agreed to supervise the visit of the Swiss partners to LU in November 2011, and to involve another member of the teaching body at LU in the project. It was not however until January 2012, over two months after the visit of the Swiss students to Cambridge, that Cristin Ashmankas, Assistant Professor and Faculty Advisor at LU, was given the task of supervising the American students. She accompanied them on their return visit to Lausanne in March 2012. Ultimately, it was two students from LU (Haley Barber and Haley Puckhaber)[1], two students from the HEP (Céline Tauxe and Marie-Hélène Weissen), and three trainers (Cristin Ashmankas at LU[2], François Gingins[3], and the author of this chapter at the HEP Vaud) who brought the project to completion.

1 A third student from LU was involved in the first phase of the project before having to abandon their studies.

2 Cristin Ashmankas has since left LU to take up another professional role.

3 François Gingins has been retired since 2014.

2. Reference Frameworks

The theoretical basis for this project derived from various academic fields and it therefore made use of multiple theoretical frameworks. These are summarized as follows, grouped into four distinct "domains."[4]

2.1 Urban Ecology and Ecodistricts

Urban ecology is now considered to be a reasonably well-defined field of research in both theoretical and practical terms (Emelianoff, 2001), with goals that span both urbanism and land use planning. On the theoretical side, the very meaning of the expression "urban ecology" is undermined by a frequent confusion between ecology *of* the urban area and ecology *in* the urban area. However, from an epistemological and methodological point of view, it is clear that an approach centered on the ecology of organisms (fauna and flora) living in green spaces in urban areas, or other ecological niches, does not have the same focus as an approach that questions the relationship between the urban area and the environment (Grimm, Grove, Pickett & Redman, 2000; Barles, 2010). Urban ecology seen as an "*ecology of the urban area*" aims to "*understand the urban milieu in a holistic manner in order to propose an alternative management and design*" (Emelianoff, 2001, p. 85). The concept of urban ecology used by the PEERS project presented here is therefore that of ecology of the urban area, rather than that with a restrictive meaning (ecology in the urban area)[5].

The conceptual ambiguity characterizing urban ecology results in diverging visions of the relationship between man and nature (Descola,

4 This grouping is primarily pragmatic. Agreed with the trainers at the HEP, it allowed the Swiss students to make connections between the various theoretical frameworks they were using, and to make rational choices and interlinking even within these frameworks.

5 The different visions of urban ecology held by the students from LU and those from the HEP presented one of the obstacles to overcome in this project.

2005), which can also be found in different meanings of the notion of environment (Theys, 2010). Thus, urban ecology can be based on a metabolic conception of the urban area as an ecosystem, on a sociological conception in the line of the Chicago School, or even on a strictly naturalistic conception (Clergeau, 2010; Armand-Fargues, 1996; Blanc, 1998; Emelianoff, 2001). The current principal research themes in urban ecology are risk management, urban agriculture, sustainable transport, the urban climate (e.g. heat islands), urban metabolism (analyzing the flow of energy, materials, and various outputs), and the issues of sustainable urbanism and architecture. The principles defining ecodistricts are particularly linked with these latter issues.

An ecodistrict is "an urban development project that respects the principles of sustainable development but also adapts to the features of the land."[6] The general characteristics of ecodistricts have been well-described by specialists, and some are even well-known among the general public (especially energy saving and "soft" mobility):

> […] qualified densification, […] morphological, functional, and social diversity, valorization of the public space, decisions in favor of collective transport and soft mobility, renaturing of the habitat, ecological management of material resources, the participation of the actors concerned in the conception, implementation, and management of living conditions (Da Cunha, 2011, p. 193).

To these features can be added a focus on the localization of the district within the agglomeration – often close to the center – and on the quality of links to the rest of the town or city, as well as the question of scale: the project must be big enough to be considered a district (Boutaud, 2009), even if the district level does not allow for the resolution of all the challenges posed in the production of a (more) sustainable urban area (Da Cunha, 2011). The ecodistrict is one of the solutions proposed to counteract the major problems of urban spread and its effects on mobility and urban sprawl, energy consumption, and even the increase of social and spatial segregation. It is therefore a tool used by political authorities

6 As described by the French Ministry for the Environment, Energy, and the Sea. Retrieved from <http://www.developpement-durable.gouv.fr/EcoQuartier,37480.html>.

and urban planners, but also – and increasingly – by individual and collective actors within civil society.

Ecodistrict projects have taken place since the 1990s in Germany, the UK, and in the countries of Northern Europe, and since the end of the 2000s, they have spread to most European states (Béal, Charvolin & Morel Journel, 2011). Some have become iconic, such as the Vauban district in Freiburg im Breisgau, Vesterbro (Hedebygade) in Copenhagen, Hammarby-Sjöstad in Stockholm, and BedZED in south London. Their completion has not been without problems, with criticism most frequently focused on the very limited social diversity of many projects: the cost of construction and development involves rental or sale costs that are simply beyond the reach of social groups of modest means. More generally, an ecodistrict development cannot really be envisaged without strong support from public groups (political, sometimes financial), which requires them to have the means for such actions.

2.2 Sustainable Development and Education for Sustainable Development

Since the early 1990s, the general public has gradually become familiar with the concept of sustainable development. It is classically defined as follows: "Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (Brundtland, 1987, p. 8). It thus brings together three economic, social, and environmental sections, or pillars: sustainable development consists of ensuring adequate wealth creation to satisfy the needs of the population, while reducing social inequalities and avoiding damage to the environment (Allemand, 2006; Hertig, 2011).

Sustainable development is an ideological concept and a political project based on various epistemological concepts, some of which are subject to controversy (Hertig, 2011). Numerous researchers deny it the status of an academic discipline, while others consider it to be a "paradigm around which fields of research and academic reflection are organized" (Allemand, 2007, p. 9). The main controversies linked

to the concept of sustainable development derive firstly from the view of the relationship between human societies and nature, with tensions crystallizing around the opposition between an anthropocentric view (nature in the service of man) resting on a nature-culture dualism, and a biocentric vision that affirms that all life forms have an equal right to life (Descola, 2005; Theys, 2010; Hertig, 2011). These antagonistic visions translate into an opposition between "weak durability" and "strong durability," this latter involving highly restrictive actions designed to protect the environment. Secondly, the very term "development," often assimilated into that of growth, is controversial in many ways, as is the arguably oxymoronic association of the words "development" and "sustainable" (Allemand, 2006, 2007; Hertig, 2011). Finally, infra- and intergenerational justice, a fundamentally ethical issue, supposes an urgent and real consideration of the needs of the most deprived in order to reduce socioeconomic disparities between and within states. It cannot be ignored that the triumph of neoliberal economics has troubled this ideal. However, despite these controversies, sustainable development, seen as a principle of action, is the bearer of a true ethics of change (Da Cunha, 2003), and it is from this perspective that Education for Sustainable Development (ESD) has been introduced into the education systems of various states over the last fifteen years.

Heir to environmental education and global education, ESD embodies a certain number of contradictions, which relate in part to the controversies surrounding the concept of sustainable development (the view of the relationship between nature and culture; relative positioning of the question of economic growth, *cf.* Varcher, 2011). But the tensions around ESD also derive from the fact that its political dimension remains too often implicit or is not fully admitted by actors in the education system (Varcher, 2011; Hertig, 2012). It also involves visions of teaching and learning that are not shared by everyone (Audigier, 2011; Varcher, 2011). However, in terms of its objectives, most researchers agree that ESD aims to ensure a "reasonable" future to both current and future generations, and to allow all pupils to acquire the knowledge and the ways of thinking that they need to understand the world in which they live and in which they will have to act as responsible citizens.

2.3 Interdisciplinarity

The huge problems faced by human societies are not disciplinary, nor are the solutions required to resolve them (Audigier & al., 2011; Hertig, 2012). Nevertheless, knowledge built across and within disciplines is vital (Astolfi, 2008; Audigier, 2011; Hertig, 2012) for pupils to understand the interactions between the multiple factors in play and the actors concerned, so that they can develop prospective scenarios and make decisions in a reasoned way.

I will not discuss here the nuances between the diverse meanings of inter- and transdisciplinarity: for readers interested in this issue, another recent text proposes an overview of this area (Diemer, 2014). Fourez (1997) notes that an interdisciplinary approach must call for disciplinary knowledge, and Lemay (2011) specifies that this approach is not limited to a simple addition of known practices and that it enables the construction of links producing meaning. A true interdisciplinary approach thus "*implies a pooling of disciplinary approaches from the moment the issue has been defined, particularly when it comes to choosing and implementing research methods*" (Poglia, 2011, p. 158). This "cross-pollination" arising from the combination of contributions from multiple disciplines is one of the keys to understanding the world (Hertig, 2009, 2012).

2.4 Didactic Approach to Teaching Scientific Disciplines

Three major models of the relationship between academic disciplines and school disciplines coexist in the French-speaking world: the model of didactic transposition (Verret, 1975; Chevallard, 1985), the model of social reference practices (Martinand, 1986), and the model of school discipline seen as an original creation of the school institution (Chervel, 1988; Audigier, 1995) (see Hertig, 2012, for an overview of the foundational principles of these three models). We could also add the concept of the disciplinary matrix, as formalized by Develay (1992). These three models and the concept proposed by Develay are

not sufficient however to understand the different ways of considering a didactic approach to the teaching of scientific disciplines.

The didactic approach used in this PEERS program[7] was founded on a systemic view of knowledge (Morin, 1999; Hertig, 2012) and developed around an approach that was structured as follows (Hertig, 2012): use of a trigger element to problematize the knowledge issue with the pupils; delegating the issue to the pupils; structuring the unit into "problem" units based on the questions generated by the trigger element; networking of knowledge by means of integrating concepts from the scientific disciplines concerned (geography and biology in this instance); and a review phase designed to enable the institutionalization of knowledge and conceptualization. Inspired by the socioconstructivist model, this didactic approach was designed so that pupils would understand the meaning of the knowledge learned, and thus enable them to acquire some of the intellectual tools they need to understand the world in which they live and in which they will have to act as citizens: one of the objectives of ESD.

3. Shared Construction of the Project: Bringing Together Divergent Visions[8]

The outline of the shared development work for the project was defined by the student partners during the Swiss students' visit to the United States. Before agreeing on the structure of the teaching units to be created, they compared their relative views of urban ecology and various key aspects of this topic, including the idea of sustainable transport, the concept of the ecodistrict, and the relevance of certain sustainability indicators.

7 This in fact was the approach implemented by the two Swiss students. Their unit plans will be covered in more detail later in the chapter.

8 The information presented in this and the following section (overview of the teaching-learning units) is based on the dissertation of the two Swiss students (Weissen & Tauxe, 2012).

The two Swiss students' vision of urban ecology had been clarified at the start of their collaboration and derived from the interdisciplinary perspective of ecology *of* the urban area. The Americans had in mind the idea of ecology *in* the urban area, and were envisaging an approach centered on an inventory of green spaces in the urban area and a description of their biological features. These differences in approach illustrate the different visions resulting from the conceptual ambiguity that characterizes urban ecology.

Different visions also became apparent when it came to the principles surrounding sustainable mobility. While the Americans focused on solutions that were based on new technologies (hybrid engines, for example) and would do little to modify the dominance of reliance on individual car use, the Swiss students emphasized the choices of public bodies aiming to develop and improve infrastructure and public transport options, and to restrict individual car use. The concept of the ecodistrict also revealed notable cultural differences on the two sides of the Atlantic: although ecodistricts have developed in the majority of western European countries since the end of the 2000s, the concept is still not widely known in the United States. The North Americans have developed ecovillages, which share some features with ecodistricts (energy efficient buildings, design and infrastructure aiming to reduce environmental impact); the ecovillage of Sawyer Hill, near the small town of Berlin, around thirty miles to the west of Boston, provides a good example[9]. Ecovillages are built in rural areas and are conceived of as spaces for micro-societies, with no specific concern for social diversity nor resolving the issue of transport to and fro (the car journey from Sawyer Hill to Boston takes forty-five minutes). The focus on ecological issues, with the goal of a harmonious relationship between man and his environment, makes the concept of the ecovillage substantially different from that of the ecodistrict.

Another cultural difference arose when the student partners discussed sustainability indicators: the priorities for the Americans were clearly biodiversity indicators, green spaces, and water management, while the

9 See Sawyer Hill EcoVillage website. Retrieved from <www.sawyerhill.org>.

Swiss students accorded as much importance to social and economic dimensions as to those concerning environmental impact.

These different visions can be partly explained by the fact that the LU students were studying environmental studies in parallel with their elementary teacher training, hence their particular sensitivity to environmental issues. Nevertheless, these differences are also cultural in nature: the relationship of North Americans (particularly in the United States) to nature rests largely on the idea of "wilderness," of a nature that is wild, intact, and protected from constant damage by man's actions (Hertig, 2011; Gunnell, 2009).

The discussions between the HEP Vaud and LU students on these issues certainly constituted one of the highlights of their collaborative work, since they enabled them to understand visions different from their own, and led them to build together a series of sustainability indicators constituting the tools of analysis for the (eco)districts studied with their pupils. The following table (table 1) summarizes the nine sustainability indicators defined by the students.

Table 1: Sustainability Indicators of a District/Ecodistrict. The names of the indicators are those used by Weissen and Tauxe (2012, pp. 21–22).

Indicator	*Characteristics*
Economic aspects	Location of businesses and other economic activities. Note the presence or absence of jobs in the economic sectors concerned.
Social aspects	Sociocultural, socioeconomic, and generational characteristics of inhabitants of the district. Location of meeting spaces.
Building and land use	Classification of buildings and infrastructures. Building density. Functions devolved to different areas of the district and linked to the use of ground surface.
Well-being, health, safety, and comfort	Services available in the district and facilities ensuring the health, safety, and quality of life of inhabitants.

Indicator	*Characteristics*
Biodiversity and green spaces	Observation and description of plant and animal species identified. Location of green spaces: private or public, man-made or natural.
Energy	Identification and classification of energy sources supplying the district. If possible, identification of sources of energy waste.
Water management	Location of any natural water sources or water courses. Water management facilities in public and private spaces.
Waste management	Location of collection points within or immediately near the district. Evaluation of waste sorting by inhabitants and businesses.
Mobility	Urban design for public transport and private transport, favoring or not favoring soft mobility. Transport habits of district inhabitants and users.

The exchanges between the student partners also enabled them to define the key characteristics of the teaching units to be developed for their pupils. These had to incorporate an initial problematization phase, outlining the issues with their pupils. The trainee teachers also planned for part of the unit to include fieldwork outside the school walls, during which the pupils would be taken to study a district according to the nine indicators listed above. The pupils would also be asked to suggest improvements to give the district studied all or some of the features of an ecodistrict. Finally, the unit had to include a general review phase.

4. The Teaching-Learning Units

The two HEP students developed an interdisciplinary teaching unit for the senior high school pupils they were teaching in their respective classes, one in the context of biology lessons, the other in the context

of geography lessons. Although the two students were on placement in different institutions, they worked closely together to develop the unit, which was developed within an interdisciplinary perspective from the very beginning (Fourez, 1997; Maingain, Dufour & Fourez, 2002). The trainees of course had to deliver most of the unit in their own respective classes due to the timetable imposed, but they were able to be involved at regular intervals in their partner's class (co-presenting, paired teaching).

The unit integrated varied teaching methods: formal "ex cathedra" teaching, group research, work in the computer lab, fieldwork, etc. In addition, the unit review phase for the first two classes was presented in the form of a half-day seminar during which the different groups of pupils from the two classes presented the results of their research, in the presence of an urbanist architect involved in the development of a future ecodistrict planned in Lausanne (the *Métamorphose* project), and of the trainers supervising the student teachers. The following table (table 2) summarizes the key characteristics of the unit developed by the Swiss students.

Table 2: Outline of the Teaching Unit Developed by the HEP Students.

Phase and Duration	*Content*	*Specific Methods*
Trigger element, problematization (1 lesson of 45 minutes)	Identification of the major issues affecting today's urban areas Development of a shared outline of the issue	Work with series of photographs
Learning unit 1 (2 lessons of 45 minutes)	Principles and objectives of sustainable development Examples of sustainable facilities, examples of ecodistricts	"Ex-cathedra" lessons, interactive lessons, directed tasks
Learning unit 2 (5 lessons of 45 minutes)	Definition of sustainability indicators Observation/fieldwork (district near the school) Each group is given one of the sustainability indicators to focus on	Group and collective work in computer lab Group work outside class

Phase and Duration	*Content*	*Specific Methods*
Intermediary evaluation (2 lessons of 45 minutes)	Groups give an oral presentation, within the class, of the initial results of their work	Group presentations, visual support (slides)
Learning unit 3 (4 lessons of 45 minutes)	Improvements from the perspective of sustainability: information search, then proposals for the sector and topic studied	Group work Computer lab Development of a written portfolio and support for final presentation
General review (method for the first two classes) (2 lessons of 45 minutes)	Seminar: the classes from the two institutions meet and share the results of their work	Slide presentations In the presence of an expert (urbanist architect)
General review (method for the two other classes) (2 lessons of 45 minutes)	Pooling (within class) of results of work Comparison of proposed improvements with real examples of ecodistricts Synthesis developed collectively	Slide presentations
Final evaluation	Evaluation of written report	

The general issue of the unit was defined as follows (or in similar terms): "*What solutions can be put in place to resolve the problems of today's urban areas from the perspective of sustainability?*" Each of these learning units, conceived as problem units (Hertig, 2012), was centered on one issue stemming from the broader issue.

On their side of the pond, the two American students developed a teaching unit designed for kindergarten and elementary pupils. In fact, rather than a teaching unit as such, they created a series of topical lessons shining a light on environmental protection issues. The outline of their

approach is presented in the following table (table 3); the information is taken from the American students' website[10].

Table 3: Outline of the Lesson Sequence Developed by the Students from LU.

10 Retrieved from <http://halecb.wix.com/peersproject#!lesson-plans-for-pre-k-through-5th>.

11 A children's short story written by Dr Seuss, the pseudonym of Theodor Seuss Geisel (1904–91). Very famous in the United States, this short story was used as the basis for a Franco-American animated film released in March 2012, around the time the LU students delivered their lesson sequence to their classes.

Phase and Duration	*Content*	*Specific Methods*
Introduction (1 lesson of 30 minutes)	Introduction to ideas of the environment and sustainability	Watching video clips
1 lesson of 60 minutes (reading)	The impact of human activities on the environment Theme of individual and collective responsibility toward the environment	Reading and discussion of the story of the "Lorax" (Seuss, 1991)[11]
1 lesson of 30 minutes (natural sciences)	Water pollution Focus on freshwater and ocean pollution	Group work, hands on (mixing liquids) and visual support (images)
1 lesson of 40–45 minutes (natural sciences, mathematics)	Recycling Introduction to waste sorting Graphical representation of the amount of "recycled" objects in teaching "boxes"	Work in small groups Purpose-designed kits
1 lesson of 30 minutes (social studies)	Urban, suburban, and rural habitats Explanation of the characteristics of these three types of habitat and their impact on the environment	Collective work, then card game (matching images and/or definitions of the three types of habitat)
(1 lesson of 45 minutes)	*How to be Green* Individual responsibility for reducing ecological footprint Waste sorting, recycling, restrictions on individual car transport Individual contract (engagement to act to protect the environment)	Collective work, centered around semi-structured exchanges between the teacher and the pupils (question canvas)
1 lesson of 30 minutes (social studies)	Fieldwork: what the school is doing to protect the environment ("mapping the green in your school")	Group work Observation, inventory, report on a map of the school
Collection of lessons dedicated to a project (between 1 and 6 hours) (interdisciplinary)	Developing a project in groups: defining the characteristics of an ecodistrict, i.e. a district where the environment is protected and the focus is on ensuring a good quality of life	Group work Brainstorming Sketch and 2D plan Then making a 3D model (with recycled objects)

Without making a systematic comparison of the two teaching units (their shared points have already been mentioned), it may be interesting to briefly highlight a few significant differences, which can mostly be attributed to the fact that the units were designed for pupils of very different ages. The type and objectives of the fieldwork are not for example the same: the young pupils of the American trainee teachers used direct observation activities, while the teenagers in the classes of the HEP Vaud trainee teachers implemented research methods that went beyond observation. The group work methods were also different: while the Swiss teenagers worked on specific tasks that varied between the different groups (the expert group approach), the young Americans also worked in groups, but with an identical task for each group. The use of computing resources was important for the HEP Vaud trainees' students, while the young pupils of the LU trainees did not use the computer as a tool but often expressed themselves through drawing. The learning evaluation methods were not of course the same, and the way of approaching the knowledge object itself differed, since the Swiss teachers were able to discuss more abstract concepts in class than the American trainees could have done with their young pupils. This particularly manifested itself through the priority given by the LU students to certain sustainability indicators that are more accessible for young children than others (for example green spaces, waste management, and water management).

5. Assessment and Perspectives

The main problem faced by the participants of this project was the fact that the student partners were on very different courses of study. This certainly limited the scope of the project, and perhaps its intrinsic interest. In many ways, rather than a project in which development, implementation, and evaluation were equally shared, this was an interdisciplinary project designed by the HEP Vaud, and then adapted by the LU students under

the supervision of Cristin Ashmankas. Ultimately, this had a significant impact on the comparative scope of the project. It would also certainly have been interesting to research more deeply into the cultural differences between divergent visions of sustainable development, urban ecology, and the relationship between man and nature.

That said, the positive aspects of this project must be highlighted. Above all, it was an opportunity for all the participants involved to develop personally through numerous moments of exchange, during week-long visits to Boston/Cambridge and to Lausanne, and through the intermediary of social networking resources. For the student teachers, collaborating with colleagues whose views on ecology and on the teaching approach to social hot topics or scientific controversies were very different from their own, was doubtless instructive, for it led them to question and alter their own visions and views – a reflective approach that all teachers must or should implement on an ongoing basis.

This project also led to several achievements that deserve to be mentioned here. Firstly, the project was presented at the PEERS Symposium organized as part of the World Association for Educational Research conference (WAER), held in Reims in June 2012. In addition to the three trainers involved (Cristin Ashmankas, François Gingins, and myself), the two Swiss students were able to participate in this research presentation thanks to support from the HEP Vaud. This was an important opportunity for them to gain their first experience of participating in a major conference, and of preparing a research communication.

Furthermore, the two HEP Vaud students focused their dissertation on the PEERS project. They also developed a detailed teaching guide allowing other teachers to implement a teaching unit on ecodistricts, and a redesigned version of this guide (Tauxe & Weissen, 2013) was uploaded to the website of the "Education 21" foundation, the national center for delivery and skills that supports the implementation of ESD in Switzerland. Teaching units looking at ecodistricts, with a structure more or less inspired by that developed by the two Swiss students, have been implemented in several institutions in the Canton of Vaud. Finally,

the two students produced a brief article presenting their project in the *Prismes* journal produced by the HEP Vaud (Weissen & Tauxe, 2013). The American student teachers produced a website dedicated to the project, and many of the documents that they produced for the implementation of their teaching unit are still available from this resource[12].

Plans for collaboration between the HEP Vaud and the LU in the field of ESD have not yet been finalized beyond a second experience of the PEERS project (see Alain Pache's chapter in this volume) (Pache, 2017), due to Cristin Ashmankas having moved away from the institution. Focusing purely on the project described here, a particular highlight was the very strong engagement of the two Swiss students, who learned a great deal about interdisciplinarity through this experience, and who produced very high quality work; the two American students involved from the beginning of the project were also strongly invested once Cristin Ashmankas began supervising their work. The respective partner visits to Boston and Lausanne led to very rich personal and cultural exchanges. And finally, it is doubtless that the pupils taught by the students, and the students themselves, gained most from this project. The former, whether very young or teenagers, were able to acquire tools for understanding the world. The latter, as young teachers, gained personal, teaching, and methodological experiences that they will draw upon for the rest of their professional lives.

12 Home page retrieved from <http://halecb.wix.com/peersproject#>.

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Chapter 16: Ideology, Culture and Language Preparing International and Critically Conscious Teachers: Difficulties and Advantages of a PEERS Project Focusing on Interculturalism

Abstract
For three consecutive years, a group of students from the University of Teacher Education of State of Vaud (HEP Vaud), and from the College of Education at San Diego State University (SDSU), has collaborated to define a student exchange project. Three students from each institution engaged in individual projects implemented in two particular contexts: foreign language classes in the school system of Vaud, and bilingual education in the California public school system. Through a methodology based on pre and post reflection, interviews, and questionnaires to focus groups, the projects intended to explore how teachers addressed challenges in multilingual and multicultural classes. Students and faculty from both institutions focused on specific issues of research including how educational systems address the needs of linguistically and culturally diverse students; effective pedagogical approaches to implementing *interculturalism*; and implementing critical thinking, technology, and collaboration within the day-to-day teaching and learning practices.

"*I will never teach in the same way again!*"
A student during the exchange

1. Introduction

The main aim of this article is not to outline the methods of collection and analysis resulting in a series of rigorously scientific research results, but rather to acknowledge the number and complexity of processes triggered by confrontation with the Other, whether this is represented by individuals, places, habits, and customs, or above all by experiences of schooling from the point of view of pupils and particularly of teachers.

The belief that communication and exchange, collaboration around a project, and shared experience – with partners living, studying, and working on the other side of the world, near or far away – represent undeniable added value and indisputable enrichment in a program of teacher education is the key motivation for all the individuals who have taken part in the PEERS (*Projet d'Étudiants et d'Enseignants-chercheurs en Réseaux Sociaux* or Student and Teacher-Researchers Social Networks Project) program.

That said, motivation and engagement should not prevent us from remaining clear-headed about the obstacles and difficulties, both external and internal to the individual, that punctuate such an international experience. Fortunately so, as it is the inevitable confrontation of the person we are with the Other that we meet that engenders linguistic and intercultural understanding and a reflective step back from the opposed ideologies.

The trainers and trainee teachers involved in the project have benefited from a unique experience that has enabled them to experience real-life situations involving concepts that are now fundamental to the training of teachers preparing to practice their profession in a school context where a variety of languages, cultures, ethnicities, and social classes mix on a daily basis. In such a context the role and behavior

of teachers, and the pedagogical and didactic choices that they make, can only be defined from a plurilingual and intercultural pedagogical perspective.

Despite the confrontation between different schools of thought, theoretical references, and educational policies, it was immediately evident that the shared experiences of the exchange project were comparable on both sides of the ocean.

The experiences of the project participants thus correspond to the words of Cuq (2003) who defines the concept of interculturalism as follows:

> […] interculturalism affirmed the importance of the inter- prefix, which enabled us to go beyond the multicultural. The intercultural is in fact the exchange between different cultures: coordination, connection, and mutual enrichment. Far from being an impoverishment, as claimed by conservatives, actual contact between different cultures offers an opportunity in which everyone can find a supplement to their own cultures (which they do not of course wish to give up) (Cuq, 2003, p. 136).

Chaves, Favier and Pelissier (2012) define *multiculturalism*, at the level of society, as "the cohabitation and parallel coexistence of several sociocultural groups within a society" and pluriculturalism, at the level of the individual, as "the capacity to identify with, and participate in, multiple cultures."

As for *interculturality*, they describe it as follows:

> The intercultural is defined as a dynamic process of exchanges between different cultures. The intercultural exists only where there is an exchange, an encounter, or a sharing. It is not a fact to be taught but rather an approach that aims to build bridges and links between cultures. This approach therefore requires a constant rebuilding of identity in relation to alterity; it is about accepting the diversity of perspectives, encountering other points of view, and understanding different ways of life; and also understanding that an individual is rarely the product of a sole cultural affiliation.

This is indeed what emerged from the spontaneous and non-transcribed discussions of participants in the HEP Vaud-SDSU PEERS project, with a focus on the experience rather than the tangible outcomes initially

aimed for by the shared work, over the course of the three instances described in this chapter.

2. Outline of the HEP Vaud-SDSU PEERS Project

The exchange between the University of Teacher Education, State of Vaud (HEP Vaud) in Switzerland and San Diego State University (SDSU) in the United States took place over the course of three academic years, along the broad framework of the protocol defined for PEERS program projects. However, it was not always possible to follow this protocol to the letter due to unforeseen circumstances, particularly regarding student participation. We will return to this point later in the chapter.

Over the three academic years, between fall 2011 and spring 2014, with an OUT component (visit by the HEP Vaud group to SDSU) in October-November and an IN component (visit by the SDSU group to HEP Vaud) in March-April, this beta-test PEERS project was run as a collaboration between myself and two colleagues from SDSU, accompanied respectively by 7 and 9 students from each institution. It enabled us to explore a number of teaching/learning approaches, both at the level of pupils through visits and classroom observations, and at the level of trainee teachers, through the use of reflective and analytical learning approaches to visits and discussions that aimed to challenge opinions and lived experiences of the Other.

The shared and enduring objective was always to contribute to the development of competencies such as openness to the international (global) dimension of learning, taking critical distance in all learning situations, and gauging the role played by language in all its forms. These objectives applied to all the individuals involved in the project, both tutors and tutees.

From the earliest moments of the three PEERS projects shared by HEP Vaud and SDSU, the issue of language played a major role.

Although the exchange between two plurilingual educational contexts was one of the project's leading features, it quickly became apparent that there would only be one working language: English. Swiss educational policy has made English an international language learned by all pupils from elementary school onward, along with two of the three national languages. The students from HEP Vaud were thus able to cope fairly easily in an Anglophone training context.

When it comes to the Californian educational policy concerning languages, however – we have insufficient space to consider such policies in the United States as a whole – French is clearly a low priority given the numerical, economic, and sociocultural weight of Spanish and Mandarin Chinese. Neither the professors nor the students from SDSU would have been able to participate in the projects if French had been even very partially used.

The English linguistic and cultural skills of the trainee teachers from the HEP enabled them to spend their time in San Diego in a situation of almost complete immersion, which was therefore particularly instructive and enriching. In contrast, during their visits to Lausanne, the professors and students from California required linguistic and cultural mediation at all times. This did however serve to further demonstrate the benefit provided by every situation of contact with otherness, even if easy or undemanding: acting as mediators enabled the Swiss professor and students to see in a new light the everyday realities that they took for granted.

The *Common European Framework of Reference for Languages* (CEFR, 2001) highlights the relationship that exists between intercultural awareness and the skill of mediation:

> Knowledge, awareness and understanding of the relation (similarities and distinctive differences) between the "world of origin" and the "world of the target community" produce an intercultural awareness. It is, of course, important to note that intercultural awareness includes an awareness of regional and social diversity in both worlds. It is also enriched by awareness of a wider range of cultures than those carried by the learner's L1
> and L2. This wider awareness helps to place both in context. […]
> Intercultural skills and know-how include:

- the ability to bring the culture of origin and the foreign culture into relation with each other;
- cultural sensitivity and the ability to identify and use a variety of strategies for contact with those from other cultures;
- the capacity to fulfil the role of cultural intermediary between one's own culture and the foreign culture and to deal effectively with intercultural misunderstanding and conflict situations;
- the ability to overcome stereotyped relationships (CEFR, 2001, p. 103–105).

3. Participant Profiles: The Trainee Teachers

Somewhat surprisingly, one fact was clear on both sides of the ocean: it was not always easy to find students who were ready to launch themselves into the adventure of the exchange. This was due to many reasons, primarily of a practical nature. Time after time, students who were very interested in the project and met all the required criteria for participation had to pass up on the opportunity due to a lack of childcare provision, major commitments relating to their placements, or important coursework linked to their training due just at the time of departure.

The partner institutions agreed from the beginning that the project would be designed for students training to teach middle and high school level. The first exchange with SDSU involved three students from the high school teaching stream, while the two others involved students from the middle school teaching stream. Since the professors involved came from a background of language teacher training, and a linguistic question was integral to the exchange between the two institutions (situated in Anglophone and Francophone countries but strongly marked by plurilingualism), the project participants from SDSU were mostly training to teach English as a first and second language, and the participants from the HEP were training to teach foreign languages.

4. Participant Profiles: The Teacher Trainers

The personal, professional, and ideological profiles of the trainers involved – in terms of education and educability – had an unquestionably important role in the achievement and success of the PEERS project, providing as much distance and diversity as that between HEP Vaud and SDSU.

The three professors participating in the project immediately found common ground in their shared belief that internationalization and mobility should be part of twenty-first-century teacher training. They also discovered a shared plurilingual profile, a background combining teaching experience and academic education, and an insatiable curiosity to seek out new knowledge and new encounters.

This was however challenged by the impact of different views of education – in terms of the dominant and traditional educational philosophy – on methods of teaching and learning that affect the everyday life of teachers and pupils, and thus the ways in which they view the teaching profession. The Californian approach is more strongly influenced by ideology, with a particularly strong attachment to pedagogical thinkers such as Paulo Freire, and places greater emphasis on the development of transversal competencies rather than the accumulation of knowledge. The approach in Romandy (French-speaking Switzerland), on the other hand, allows space to choose transversal competencies but nevertheless provides a curriculum marked by explicit requirements regarding knowledge and disciplinary skills.

In summing up what the PEERS project had given them, the three trainers were in unanimous agreement: shared school visits, long discussions alone or with the students, and invitations to observe their respective lessons were opportunities for each of them to enrich their theoretical knowledge and open up to the educational landscapes of the two countries, thus achieving one of the principal objectives of the internationalization of teacher education (Koziol & al., 2011).

5. Topics and Types of Collaboration

With the academic year beginning in September and the "OUT" leg of the HEP Vaud-SDSU exchange project taking place toward the end of October, the real launch of the shared project was always going to be the week in San Diego. These meetings immediately demonstrated the common interests of participants, and a plethora of possible study ideas emerged which then came up against reality. This was the reality of an overloaded timetable, different pedagogical schools of thought, and school systems based on different principles and language barriers. The long, in-depth discussions about these aspects were not documented, either with note-taking or audio recording, but they were moments of great richness and might each have provided material for research in their own right.

The shared interests and engagement of each individual involved enabled the project to be concluded within six months on three occasions; promising beginnings did not always culminate in conclusive outcomes from the point of view of the research results, but this is an inherent risk in any group project, particularly when collaboration is primarily remote. Such projects were however very fruitful for student education, with the plans and processes being important sources of learning and development for the trainee teachers, even without concrete outcomes.

In the first instance of the project, the topic of interest was how education can take into consideration the diversity of pupils on an everyday basis, particularly from the point of view of their linguistic and cultural needs. From this "umbrella question," the six students developed six aspects of this topic, in six different contexts, in relation to their personal interests and with a view to carrying out research that would form an integral part of the coursework required to obtain their respective teaching diplomas.

The first shared discussions in San Diego led to an "umbrella question" encompassing the questions that formed the basis of the individual research carried out by the six students: "How do the Swiss and American education systems take into consideration the linguistic needs of pupils with different languages and cultures?" The question was approached from three points of view: the institutions, the teachers, and the pupils.

In San Diego, one student investigated educational institutions to find out how they managed the issues of race, language, and unequal treatment. The second student worked with four teachers to measure the impact of teaching ideology on the results of their pupils learning English as a second language. Finally, the third student investigated the effect of high strategy tests on the dropout rate of pupils with English as a second language and from a lower socioeconomic background.

In Lausanne, the three students focused on the case of pupils with different language levels (too low or too high) in the foreign language class they attended. The first student investigated the institutional aspect by analyzing the Romandy, Swiss, and European official decisions and declarations. The second interviewed four teachers to discover what methods they used in their lessons with pupils at different levels. The third student looked at the way in which these pupils experienced their linguistic difference.

The six students shared theoretical reading and resources, and used the same research techniques: literature reviews, document analysis, questionnaires, interviews, and classroom observation. Several shared observations emerged from their work: ideology weighs heavily on education, which is never neutral; contradictions must always be questioned and different educational actors given the opportunity to speak; and theory and practice produce a *praxis*, an educational action underlined by a pedagogy of hope (as defined by Paulo Freire).

The second instance of the exchange project suffered from difficulties relating to the respective and sometimes challenging situations of the participants. With only one student at HEP Vaud and three students with very different profiles at SDSU, it was impossible to bring the project to a concrete and tangible conclusion. The initial idea had however enjoyed consensus: to investigate the concept of interculturality and its implementation in a global context from two angles, the place of interculturality in foreign language teaching (German in the Romandy area of Switzerland, English as a foreign language in San Diego) and its place in the teaching of non-language disciplines (history in both contexts).

During the first shared discussions in San Diego it became immediately evident that the research interests and reflections would be

the same as in the first project: in the two different contexts the issues to investigate were the same, and still connected to the linguistic, social, and intercultural dimensions of language teaching and teaching in general. The research question shared by the four students was outlined as follows: "How can the intercultural perspective be integrated in different contexts and different teaching disciplines?" The research approach consisted of implementing various pedagogical and didactic approaches involving an intercultural perspective, accompanied by questionnaires and/or interviews.

In San Diego, the project was implemented in history and English classes in a vocational high school where two of the three students participating in the project were teaching, and which was visited during the stay in San Diego. These two students completed their diploma course.

In Lausanne, the sole HEP student was on a middle school teaching diploma course spread over two years. He used the 2012–13 year to develop the theoretical framework and outline the concepts, thanks in particular to the exchanges that took place during the PEERS project. He then implemented teaching units as part of his middle school teaching placement, and completed his thesis during the following academic year.

The third instance of the project brought together six students who shared two key characteristics: a very strong command of English, and participation on a totally voluntary basis, i.e. not linked to their diploma coursework. The concrete culmination of the project in that year would therefore be an end in itself. The subject that interested the whole group was the analysis of the presence in the common curricula of the two regions concerned (Romandy and California) of three competencies considered indispensable in the educational context of the twenty-first century: critical thinking, the use of technology, and the ability to collaborate.

During the first shared discussions in San Diego it became immediately evident that the research interests and reflections would be the same as in the first two projects: in the two different contexts the issues to investigate were the same and still connected to the linguistic, social, and intercultural dimensions of language teaching and teaching in

general. One additional shared feature emerged during the meeting in the fall: in both California and the United States in general, as in Switzerland and Europe, individuals working in the field of education were struggling to implement common and coordinated curricula.

In the United States there was lively discussion about this initiative:

> The Common Core is a set of high-quality academic standards in mathematics and English language arts/literacy (ELA). These learning goals outline what a student should know and be able to do at the end of each grade. The standards were created to ensure that all students graduate from high school with the skills and knowledge necessary to succeed in college, career, and life, regardless of where they live. Forty-two states, the District of Columbia, four territories, and the Department of Defense Education Activity (DoDEA) have voluntarily adopted and are moving forward with the Common Core (Common Core State Standards Initiative, 2017, retrieved from: <http://www.corestandards.org/about-the-standards>).

Switzerland was also working toward a consistent arrangement:

> The intercantonal harmonization of compulsory education agreement (HarmoS) covers the duration and objectives of schooling levels and language teaching, as well as time blocks, and daily routine, while updating the provisions of the 1970 schooling agreement regarding the compulsory school age and the duration of compulsory education. The agreement came into effect on August 1, 2009 (Conférence Suisse des Directeurs de L'Instruction Publique [Swiss Conference of Cantonal Ministers of Education], 2017, retrieved from: <http://www.edk.ch/dyn/11737.php>).

Collaborative pairs formed very quickly and spontaneously, and the students began to work in a particularly productive fashion. They decided to analyze the respective curricula and their transposition to the classroom from three angles: the development of critical thinking, the emergence of technological tools, and collaborative pedagogy. Each student contributed to data collection through questionnaires and interviews carried out in their respective placement institutions.

Remote collaboration and the second visit culminated in a shared presentation of project results during the final day of the spring term. This was the first "PEERS Study Day," centering on the students' presentation of their research project, and framed by lectures given by four external

speakers from Europe and the United States. The program represented an important moment of experience and intercultural and linguistic awareness, in which mediation played a key role; the external speakers in effect added diversity to diversity, both with their origin and their professional, linguistic, and cultural profiles.

- Dr. Gregg Glover, Associate Director of Admissions at the Graduate School of Education, Harvard University – *Internationalization of Teacher Training and Globalization*;
- Dr. Fred Dervin, Professor of Multicultural Education at the University of Helsinki (Finland) – *Internationalization of Teacher Training and the Intercultural Dimension*;
- Pierre Moinard, Head of Distance Teaching at the University of Cergy-Pontoise (France) – *Distance Teacher Training: A Framework*;
- Dr. Gerry O'Reilly, Senior Lecturer in Geography and International Affairs Coordinator for St Patrick's College, Dublin – *Internationalization and Education: Experiences from Dublin.*

6. Outcomes and Evaluation

Physical and sociocultural distance between the countries, educational contexts, and personal circumstances contributed to both the added value and to the obstacles faced by this PEERS project over the course of three academic years.

Although the two one-week in-person visits in each of the three years were unique, fruitful, and well-organized, the intermediary and above all concluding phases were challenging, and distance was not always conducive to a productive conclusion to the project (a publication, for example), nor to continuation of the collaboration between participants who exceeded the time required to complete the project.

It is difficult in such circumstances to evaluate the results of these three instances of our PEERS project except through outcomes and

regular events. I would highlight two of these: firstly, the publication and oral examination of individual certification work, and secondly, as part of the third instance of the project, the organization of a PEERS study day held in Lausanne in March 2014. This second form of collaborative work evaluation is characteristic of PEERS projects focused on research, development, and training, and has the particular value of including student presentations on the project and its results in an international and plurilingual context ensured by the presence of experts from several different countries. Ideally, every PEERS-type project would culminate in such an assembly, but again, reality poses limits that are sometimes impossible to overcome.

7. Obstacles and Incompletion

At the beginning of this chapter I noted the importance of remaining clear-headed and realistic about both the strong and the weak points of our PEERS project, in order to avoid obscuring its true benefits with an idealistic vision of the interlinguistic and intercultural situation. Perfection is not the only alternative to inertia, and it is the journey that counts, not the destination.

It must therefore be recognized that in an age of global communication where the virtual reigns supreme and "everyone is connected at all times," remote collaborative working still often remains illusory. The key moments of this project were always those between the two in-person visits, and after the end of the academic year. Working on shared documents thanks to tools such as Dropbox, which is undeniably effective, requires strict discipline and precise time organization, particularly when there is a time difference of nine hours between the homes of the participants. Fitting this organization into the burden of training and teaching in two different places requires careful juggling, and unfortunately did not always lead to the hoped-for success, at least in the context of the HEP Vaud-SDSU project.

In our case, the problem of spatial distance was compounded by the difficult issue of the working and thus writing language. The Swiss participants were required to demonstrate a sufficient level of English, and were able to do so as a result of their plurilingual education system (with both official languages and English taught from elementary school). The participants on the Californian side certainly had the advantage of a much stronger English-Spanish bilingualism, but had no knowledge of French. The working language was therefore always English and in particular the English of education, which led to a number of difficulties concerning terminology and thus the definition of concepts related to the questions at hand.

8. Consistent Features and Benefits

Following these three consecutive projects, the professor from HEP Vaud, namely myself, is the person best able to highlight the consistent positive aspects and beneficial effects demonstrated during the three exchanges between HEP Vaud and SDSU.

Firstly, I would note the relative ease with which the initial study questions always emerged from the early discussions between the professors, who met twice a year, and the students who were meeting one another for the first time. These were:

- How do the Swiss and American education systems take into consideration the linguistic needs of pupils with different languages and cultures?
- How can the intercultural perspective be integrated in different contexts and teaching disciplines?
- How are the development of critical thinking, the emergence of technological tools, and collaborative pedagogy, which are key elements in the respective curricula, transposed into everyday teaching?

Looking at these questions, which reflect pedagogical and didactic concerns that trainee teachers must master during their training, and considering how easily they emerged, it is clear that despite everything that separates the two educational systems represented in the HEP Vaud-SDSU project, the challenges of education and teacher training are the same, and correspond to those highlighted in the studies cited in the bibliography. The first consistent feature is thus a shared need to respond collectively to problems affecting educational systems at a global level.

A second element raised by all three instances, and one which gained the unanimous support and satisfaction of project participants, is contact on the ground. Having the opportunity to go into schools, see pupils and teachers at work there, and discuss things with them, was always mentioned as the high point for each exchange visit on both sides of the Atlantic. The groups from Lausanne were particularly struck by the way in which classes were staffed and organized in the San Diego schools: the pedagogical use of space, particularly the display and projection walls; the priority accorded to tasks and collaboration, giving the teacher the role of enabler rather than bearer of knowledge; and the evaluation of the work of all pupils with a strong emphasis on the process and progress rather than the results. On their return visit to Lausanne, the Californians expressed their wonder and admiration of the typically Swiss dual vocational education system, which is being considered with interest by an increasing number of countries, including the United States.

Returning to the definitions proposed earlier, and particularly to the vision of experience and (inter)cultural awareness as a dynamic process – a continuous coming and going between the cultures present –, an added value to the project also resides in the fact that students and professors were required to play the role of mediator, which enabled them to gain a better understanding of what seemed to them to be entirely familiar.

Finally, we should note what the three HEP Vaud-SDSU projects brought to everyone on a strictly personal level, varying according to disciplinary and professional identity. These effects could, and perhaps should, be expressed through a qualitative research approach, but the obstacles identified earlier challenged the students as well as the trainers:

the shortness of the time spent together, the difficulty of remote working, and the management of very busy professional schedules.

The experience had a great impact; the effects were not scientifically measured and left no real observable traces, but they often peppered the working discussions and informal conversations, through such phrases as "I will never teach in the same way again!"

9. Conclusions and Perspectives

The PEERS project shared by HEP Vaud and SDSU did not continue beyond 2014, as practical, essentially financial, obstacles, as well as issues linked to the duration of the exchange visits in light of the long journey separating the two countries, overcame the training benefits.

However, the three occurrences discussed in this chapter reiterate the need to support and develop international exchanges as an integral part of teacher education.

Although research topics are likely to emerge very easily from the initial contact between partners – the challenges to be overcome in the educational landscape are in no danger of disappearing – the obstacles must be accounted for on several levels. Particular care must therefore be taken to solve practical problems (funding, travel, and accommodation), and to have clear communication with all trainee teachers, particularly via an evaluation of the results of completed projects, which should be integrated before, during, and after each project as part of the study plan of the students and trainers who wish to take part in the adventure of the international exchange.