

Student Perceptions of Fieldwork Utility across Three International Field Courses

A.L. RYDANT¹

Keene State College, Keene, NH, USA

Christopher CUSACK²

Keene State College, Keene, NH, USA

John P. SMITH³

Independent Scholar, Barmouth, UK

Brian A. SHIPLEE⁴

University of Wolverhampton, Wolverhampton, UK

Bryon MIDDLEKAUFF⁵

Plymouth State University, Plymouth, NH, USA

Abstract

Fieldwork is a critical component in geographic education. This study examines the impact on the development of skills across six field courses, over five years, and among students from three institutions. A survey instrument comprised of 46 questions in eight categories serves as the vehicle for primary data collection. Student perceptions are examined in such conceptual skill sets as personal/self-management, cooperation and independence, managing information and data, teamwork, problem solving, and communication fluency. Results demonstrate the value of the field course experience in a number of key factors (including increased geographic knowledge, greater understanding and appreciation of local culture, and gaining a different perspective of skills management) in each of these sets, as well as institutional differences between students. Analysis also shows that a course with a service-learning component has important impacts. Implications for future research are noted.

Keywords: geographic education, fieldwork, skill sets, student perceptions, service-learning

¹ Corresponding author: Dr.; Department of Geography, Keene State College, Keene, New Hampshire, USA, 01.603.358.2508. arydant@keene.edu.

² Dr. Christopher Cusack, Department of Geography, Keene State College, Keene, New Hampshire, USA. ccusack@keene.edu.

³ Dr. John P. Smith, Independent Scholar, Barmouth, Wales, UK. jpsandas@yahoo.com

⁴ Dr. Brian A. Shiplee, Faculty of Science and Engineering, University of Wolverhampton, Wolverhampton, UK, b.shiplee@wlv.ac.uk

⁵ Dr. Bryon Middlekauff, Social Science and Environmental Science and Policy Department, Plymouth State University, Plymouth New Hampshire, USA, bryonm@plymouth.edu

Introduction

“Fieldwork is good” according to Boyle *et al* (2007) following a comprehensive examination of “whether or not fieldwork achieves any of its stated objectives...” (299). Fieldwork is an integral component of geography and the geosciences in general and that its value “lies in its ability to provide an environment in which knowledge, attitudes, and skills (i.e. learning in the cognitive, affective, and psychomotor domain) can be integrated” (Boyle, Ryan & Stokes 2009: 317-318). It has been examined extensively in recent years, especially in light of rising costs, liability issues, and emerging assessment criteria (see, for example, Conrad & Dunek 2012, Riggs, Balliet & Lieder 2009, Aitchison & Ali 2007, Boyle *et al* (2007), Lathrop & Ebbett 2006, and Kent *et al* 1997). But do the experiences and outcomes students gain from field courses measure up to today’s educational, assessment, and accountability demands?

Numerous studies have touted the positive impacts of working outside the classroom. These impacts range from experiencing deep learning (Dummer *et al* 2008), increased competencies related to career demands, leadership, and communication skills (Garcia *et al* 2013, Solem, Chueng & Schlempler 2008), teamwork and problem solving (Kelly & Riggs 2006, Haigh & Kilmartin 1999), time management (Kneale 1996), and in a cross-cultural setting a shift in values and beliefs in constructive directions (Bond, Koont, & Stephenson 2005). Zamastil-Vondrova (2005) concluded that field experiences helped students reflect on their own strengths and weaknesses, built self-confidence, and enhanced cultural awareness. Working in the field enhances subject matter knowledge, peer interactions, and inculcates technical and holistic skills in students (Fuller, Gaskin & Scott 2003). Similarly, Mullens, Bristow, and Cuper (2012) found that educators believe field courses enhance student growth.

Testimonials and general conclusions regarding the utility of fieldwork abound in the bulk of this domain’s assessment literature. Early systematic analysis by Kent *et al* (1997) clearly summarized its broad value noting that it enhances skills across a broad range of organizational, interpersonal, and intellectual activities. Rydant *et al* (2010) examined these foundations as well as current fieldwork practices and concluded that we need to move beyond the general affirmations of success, which are, in essence, based upon little more than anecdotal evidence or “reflections” on the success or merits of such field experiences. Based on more than 25 field courses over 20 years, they offer a more comprehensive, detailed, and assessable framework for student learning and skills development tied to a cascading skills development framework for use across the geographic and environmental field curricula (Rydant *et al* 2010). This study, as described below, takes a next step in quantifying success.

The development of student skills during their university tenure obviously encompasses a broad range of curricula. Conrad & Dunek (2012) posit that individuals need to be able to address unanticipated challenges and opportunities, i.e. inquiry-driven learners. We need creative and disciplined problem solvers; a learner versus one who has learned. Misty, White & Berardi (2006), in an analysis of skills development that employers expect from earning a Master’s degree, outline 10 requisite skills, including demonstrating competencies in research, teamwork, communication, management,

problem solving, and adaptability. While focusing on postgraduate education the thrust of their work clearly intimates that such skills are not systematically developed in students during their undergraduate program. Further, Whitmeyer, Mogk, & Pyle (2009) add field competence as an essential skill for employment. Haigh & Kilmartin (1999) address advancement in independence, negotiation, synthesis, and information handling, among others, while Boyle, Ryan & Stokes (2009) tie successful fieldwork to independence and initiative. Gonzales & Semken (2006) utilized summative student evaluations of field research to assess and indeed verify increased interest and knowledge of subject matter, understanding of scientific research, and fieldwork utility for future employment. Even early interventions in an emerging program of fieldwork for junior high school students in China demonstrates that it deepened students understanding of issues, fostered cognitive and affective benefits, and provided transferrable skills and knowledge (Yang *et al* 2013).

What this research indicates is that educational institutions at all levels and that tutors, teachers, and educators, as well as employers are looking for authentic learning in students, which employs “real-world problems in ways that are relevant to them” (Carlson, 2002:1). Authentic learning focuses on real-world problems and their solutions and “intentionally brings into play multiple disciplines, multiple perspectives, ways of working, habits of mind, and community” (Lombardi & Oblinger, 2007:3). These can clearly be projected via fieldwork, in such conceptual skill sets as personal/self-management, cooperation and independence, managing information and data, teamwork, problem solving, and communication fluency. From a specific geographic perspective, base expectations also reside in the ability to think spatially as well as subject matter mastery and application.

In essence this broad range of literature lauds the advantages of engaging in fieldwork but often presents little quantifiable evidence for its utility and only occasionally delves into the myriad components that underlie effective fieldwork. Rarely do we see parameters explicitly measuring skills management (such as goal setting and broadening one’s perspective), managing information and public speaking, team building skills (such as taking initiative and negotiation), and observational skills and peer evaluation protocols. These are real issues and gaps in the literature that should be more fully explored, especially in the current milieu of financial restraint in higher education and the increasing difficulty students experience in both funding their education and securing viable employment upon graduation. Here we attempt to provide such a database. While such analysis will not be a panacea or the definitive answer to the quantification issue in fieldwork utility, it will help forge a pathway to demonstrating (especially to administrators) how fieldwork should be an integral component in geography and the geosciences.

Methodology

This study examines student perceptions of fieldwork efficacy across six national and international field courses via a comprehensive, post-course survey. Each course was run twice over a number of years. The Desert Southwest USA course focused on physical and cultural geography and was run in 2008 and 2011. The New England

Environmental Field Course addressed environmental issues and environmental management themes and occurred in 2007 and 2010. Finally, the Ecuador course concentrated on cultural foundations and physical geography and took place in 2007 and 2009. Total sample size is 84. Consistency of faculty ensured uniform measures of delivery, pedagogy, and assessment.

Further, as a measure of control and consistency across these three courses we employed a matrix of subject, personal, and generic skills. Each set of subject skills denotes the generic skill of which it is composed, and a general description of how it was evaluated. For example, each program required observational skills, where students had to critically observe the components of the physical and cultural landscape via, for example, a field notebook. They team-researched a topic appropriate to the course prior to departure and then presented their findings, both orally and in writing, in the field. Through this we could assess their use of IT, numeracy and graphicacy, and their ability to integrate and synthesize data.

The vast majority of students was either geography or environmental science majors and ranged from their second to their final year of undergraduate studies. The New England course consisted entirely of environmental science majors from the University of Wolverhampton (UW), United Kingdom; the Desert Southwest students were from the three universities represented by the author's affiliations; participants on the Ecuador course, which included a Service-Learning component were solely from Keene State College (KSC). Overall participants comprised a representative sample of geography and environmental science majors at all three universities, that is, members ranged across each grade level, academic standing, and socio-economic grouping.

Our end of course survey instrument was designed to test the effectiveness of our field courses as formulated above. As such it does not test across non-participants or other field endeavors. Moreover, it was constructed to adhere to standard Institutional Review Board (IRB) regulations, as well as each university's guidelines ensuring anonymity. Thus it did not solicit personal data. It was fashioned using a standard five point Likert Scale and incorporated concepts demonstrated in a host of studies (Chatterjea (2012), Nam & Ito (2011), Boyle *et al* (2009), Pyle (2009), Gonzales & Semken (2006), and Haigh & Kilmartin (1999)) to be valid and reliable measures of assessment, both prior to and following our formulation. These include, respective to each study noted above, field application of concepts, data collection, synthesis and presentation, information literacy, critical thinking, improved content knowledge and knowledge application, interpersonal skills, building teamwork skills, developing habits of mind that govern the application of the knowledge and skill sets queried in our survey, meeting research/project objectives, and problem solving and communication skills. Concepts were imbedded in a two-part, 46 question survey (Appendix A, NB. Concepts and skill set labels did not appear on the student version).

The first component queried more general course concepts, such as increased knowledge base, task accomplishment, enhanced knowledge of local culture, and the like (9 items). The second section included 37 more focused items divided into seven skill set dimensions (1. Management – 5 items; 2. Learning – 4 items; 3. Information –

8 items; 4. Team – 3 items; 5. Problem Solving – 5 items; 6. Communication – 5 items; and 7. Geographic – 7 items).

Data analysis employed a variety of descriptive and inferential statistics; means and standard deviations from the former while the latter utilized ANOVA to examine the difference between the three institutions. Each individual skill set grouping was also t-tested for significance against the overall survey mean. In other words, did the students participating in the field courses find that the experience specifically enhanced certain sets of skills? The benefit of field courses to participants and educators, as previously noted, is commonly accepted. A question to answer, however, is whether certain skills are particularly honed or advanced through participation in such a course. Clearly, while general knowledge of the student is expected to be augmented, this research seeks to clarify whether certain sets of skills, such as skills management, communication skills, or others, are particularly impacted through involvement in a field course.

Findings

Responses of student participants in the field courses may be evaluated in respect to three specific arenas of investigation:

Field course effect on student skills

To assess whether certain skill sets were particularly influenced by a field course, the means for each skill set grouping may be compared to the overall survey mean of 4.08. Mean scores for the general concept category, as well as each of the seven sets of questions relating to particular skills, were calculated and tested for difference from the overall mean. Results reveal that the means of four sets of categories showed no significant difference from the overall survey mean, while two sets have significantly higher averages and two sets significantly lower averages. Figure 1 illustrates the averages of each set of skills in relation to the overall mean of 4.08 as generated by averaging all questions from all surveys. From the figure, it is readily evident that the General Category average and the Geographic Skills average are higher than the overall mean, while the Information Skills and Problem Solving skills are lower.

These results validate that variation among perceived benefits and the augmentation of skills as a result of field course participation by students is not insignificant. Cumulatively, the mean for General Category questions, such as those relating to increases in overall interest in geography, knowledge of regional geography, and appreciation for local culture, shows the highest score. While not surprising, these results confirm anecdotal knowledge that exposure of students to a setting where the physical and/or cultural geography is far removed from their own is truly an eye-opening experience for them. The other set of questions revealing a significantly higher mean than the overall survey average is that resulting from the Geographic Skills category. With questions relating to map reading/interpretation skills, direct application of geographic concepts, and field-based investigation, it again is no surprise that this category scores so highly. Such results afford confidence that field courses do indeed provide tangible and measurable benefits to students otherwise unattainable in a traditional classroom setting.

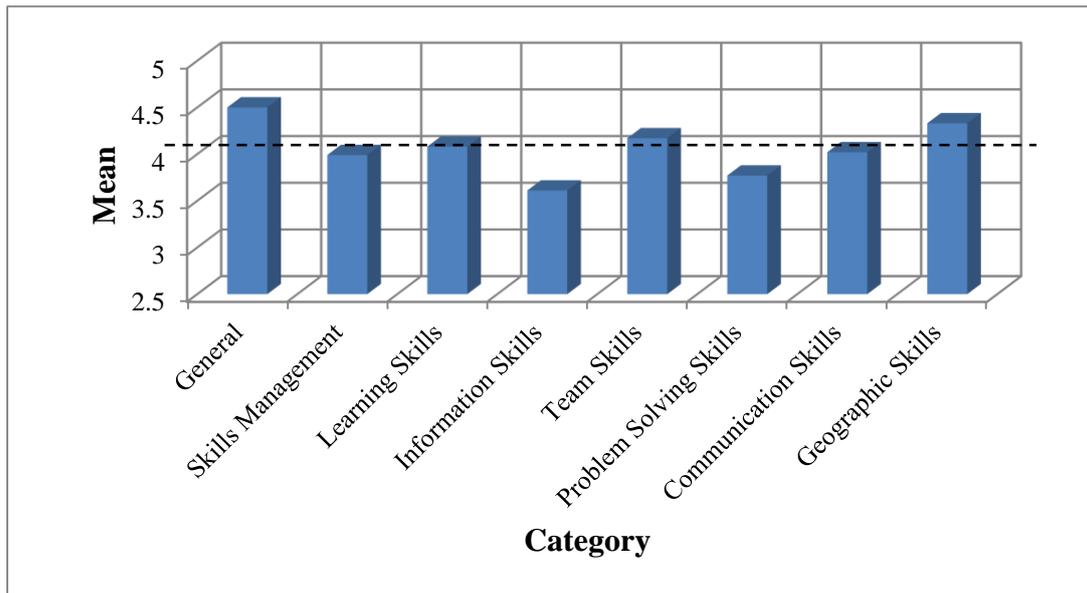


Figure 1.
Survey Category Means as compared to the Overall Survey Mean

Conversely, two sets of categories reveal significantly lower means than the overall average. Questions pertaining to Information Skills, oriented around enhancement of such secondary research activities as conducting literature reviews, referencing scholarly sources, and writing reports, result in the lowest average of all the categories. This set of questions, which relates more to student scholarship pre- and post-field course than to actual time spent in the field, demonstrates that field courses are not a panacea for improving the totality of the students' educational foundation. While students demonstrably benefit from the field course experience, these benefits do not necessarily extend to improvements in general research, reading, and writing.

The second category with a significantly lower average score is that of Problem Solving. Queries regarding the benefit of the field course in relation to students learning how to identify strategies and to evaluate success in problem solving denote relatively low scores. These results indicate that while students gain exposure to new experiences with potentially life-altering effects, particularly when a service-learning component is included as part of the field course, the field course alone does not necessarily translate into heightened problem solving skills. Such findings are perhaps to be expected, as attaining the ability to ask pertinent questions and to think critically is, for most, not a short term process. However, the uniqueness of the field course experience is such that educators should ensure that these skills are actively honed in the time allotted.

The four remaining sets of categories reveal means that are neither significantly greater nor less than the overall survey average. The means for these categories are all greater than 4.0, attesting to the fact that students across the board 'Agree' that the field course was beneficial in a myriad of ways, including: Skills Management ('helped me set goals in my life', 'helped me view issues from a different perspective', etc.);

Learning Skills ('taught me independence', 'taught me how to evaluate and implement a range of strategies', etc.); Team Skills ('assisted me in learning how to negotiate'; 'assisted me in taking responsibility', etc.); and Communication Skills ('enhanced my observational skills', 'helped me utilize effective peer evaluation', etc.). Means and significance for all sets of survey questions are provided in Table 1.

Table 1.

Difference of mean results comparing individual sets of questions to the overall survey average

<i>Category</i>	<i>Mean</i>	<i>t-value</i>	<i>Sig.</i>
General	4.50	12.970	.000
Skills Management	4.00	-1.829	.068
Learning Skills	4.08	.097	.923
Information Skills	3.62	-10.401	.000
Team Skills	4.17	1.491	.137
Problem Solving Skills	3.77	-6.121	.000
Communication Skills	4.02	-1.376	.170
Geographic Skills	4.33	6.549	.000

Significance of a service-learning field course component

In addition to examining the relative skill development of students, the set of field courses underpinning this research affords the opportunity to assess student responses in light of the presence or absence of a service-learning component. "Service-learning is a teaching and learning strategy that integrates meaningful community service with instruction and reflection to enrich the learning experience, teach civic responsibility, and strengthen communities" (National Service-Learning Clearinghouse, 2013:1). It is an effective strategy for enhancing student learning, improving the overall quality of student experiences, and promoting the development of cognitive complexity, citizenship skills, social responsibility, and active learning (Service Learning Workbook 1, 2013).

The two field courses to Ecuador included extensive service-learning where we stepped beyond the geographic milieu into a community of abandoned and abused children in Quito and Guyaquil to assist in school-based services. Here this constitutes 35 student surveys. These surveys may plausibly be compared to the remaining 49 surveys completed by students in field courses that did not include any service-learning activity. An independent difference of means test was utilized to compare the two sets of surveys. Results reveal statistically significant differences in 11 of the 46 survey questions (Survey Question #: 2,5,6,7,10,12,17,25,28,29,31). Of these, four of the significant differences are in the General Category (#s: 2,5,6,7), while none are found in either Communication Skills or Geographic Skills.

It is almost a given that field experiences enhance student interest in working outside the classroom. Moreover, since service-learning is inherently unstructured compared to

normal classroom experiences it is imperative that students clarify their roles and tasks early in the process in order for the experience to be meaningful. Such would undoubtedly contribute to the higher scores here (Survey Question #s 2,5,6).

Upon closer examination of other differences, the questions with significant difference portend valuable findings. In the Skills Management category, surveys from the service-learning courses reveal a significantly higher response in regards to the course helping students to clarify values in their lives. Spending several days volunteering at an orphanage school in Ecuador would seemingly have that effect. However, the non-service learning surveys reveal a statistically significantly higher score in response to the course helping students to learn time management. This too is revealing, as courses without a service-learning component are filled with travel, activities, lectures, and presentations from dawn to dusk each and every day. This contrasts with our service-learning courses, where several days spent volunteering at an orphanage and a school for abused children tends to slow the pace of the course.

Likewise, in the Information Skills category a significantly higher score for students in non-service learning courses is revealed in regards to field methodology skills. Again, this is perhaps to be expected, as the emphasis between the two sets of courses is not the same. One type of course is oriented more around service, and the other around observing and recording. Prior to embarking on field courses, faculty should be aware of these results so that they may pre-plan efforts to dedicate more time to service or field research as so desired. Finally, the service-learning courses reveal statistically higher results in regards to students learning how to take initiative as well as learning how to negotiate. This again goes back to time spent in the orphanage or school. Students may not always have dedicated tasks every time they are at these facilities, so they must learn how best to make themselves useful as well as how to interact with both the children and staff. In courses without service-learning, this type of interaction and need for initiative is generally less common. Again, this would speak to the objectives of the course, which should be carefully considered prior to departure.

Findings from courses with students from single and multiple institutions

A third avenue for inquiry afforded through this research is to assess whether significant difference exists in survey responses from the three groups of students undertaking the courses. One group involved British students from the University of Wolverhampton traveling to New England. A second group involved students from Keene State College (in New Hampshire) traveling to Ecuador. The third group was comprised of a mix of students from Wolverhampton, Keene State, and a second public institution in New Hampshire, that of Plymouth State University. Would, for example, the field course with a combination of students from the three institutions demonstrate greater or less skill development along the lines of teamwork, peer-evaluation, and cooperation? Would the courses where the entirety of the student participants was traveling outside their country of origin show any significant difference in comparison to the mixed course? These are the types of questions under investigation.

To test for significant difference, an Analysis of Variance (ANOVA) test was conducted on the three sets of surveys. Of the 46 survey questions, 10 were found to

have significant difference between the groups of students. To gauge the sources of the significance, a post-hoc Bonferroni test was then run. This test limits the risk of Type 1 errors by using a more conservative (smaller) alpha level to judge whether individual comparison between group means is statistically significant. It thus ensures more confidence in results (Warner 2008). The General Category had three questions of significance, while the Learning Skills, Communication Skills, and Geographic Skills categories revealed no questions of significant difference. The remaining seven significant findings are spread throughout the four categories of Skills Management, Information Skills, Team Skills, and Problem Solving Skills. Of the questions showing significance, most are due to the average response from Keene State students traveling to Ecuador being significantly higher than those of University of Wolverhampton students in traveling to New England. Table 2 displays the source of the significance for each of the 10 questions with statistically significant differences.

Table 2.

Source of significance for the 10 questions with statistically significant differences

<i>Source of Significance</i>	<i># of Findings</i>	<i>Survey #'s</i>
Keene State College > University of Wolverhampton	5	3, 6, 7, 14, 28
Keene State College and Mixed Group > University of Wolverhampton	1	29
Keene State College > University of Wolverhampton Mixed Group > Keene State College and University of Wolverhampton	1	23
Mixed Group > Keene State College	1	31
Mixed Group > University of Wolverhampton	1	32
University of Wolverhampton > Keene State College	1	12

These findings reveal a particularly stark difference between field course experiences of Keene State College students and their counterparts from the University of Wolverhampton. Seven of the 10 questions reveal significantly higher scores for Keene State students in comparison to those from Wolverhampton. In part, this likely is the result of differences in the educational settings and approaches taken in the United States and the United Kingdom. Moreover, the historic connection between the United States and United Kingdom is manifest, with the British students traveling to none other than New England for their field course. Similarity in dominant language, race, and ethnicity, among other parallels, perhaps contribute to lower survey scores from the Wolverhampton students. In contrast, students from Keene State who travel to Ecuador are in a completely foreign environment, particularly in terms of the human element, including language and culture, where all five senses encounter new and different stimuli. These dissimilarities are reflected in the questions showing significant difference. Mean responses to these types of questions reveal this contrast in field experience (Table 3).

Two other questions where KSC means were significantly higher than UW means address taking initiative and learning how to negotiate have previously been discussed in the section comparing service-learning and non-service learning courses. The final two questions of this set of seven are oriented more around scholarly activity expected of the students as part of their course and address ability to complete research and improved public speaking skills. This may be that the KSC students benefitted more from their field course, or it may simply be that the UW students were already strong in these regards and did not experience any substantive improvement. However, the totality of these results does show the benefit of taking students to a place vastly different from their own, in terms of both human and physical geography.

Table 3.

Sample of survey questions with significant difference between KSC and UW students

<i>Question</i>	<i>KSC</i> \bar{X}	<i>UW</i> \bar{X}	<i>Sig.</i>
My knowledge of regional geography increased...	4.71	4.06	.041
I gained an understanding / appreciation of the local culture...	4.94	4.25	.043
This course helped me view issues from a different perspective.	4.71	4.13	.016

Conclusion and Discussion

Without question, a properly planned and executed field course can be an exceptional means by which students accrue primary knowledge. Yet more than simply expanding knowledge, this type of involvement can also serve as an eye-opening and even life-changing experience for students. Geographic fieldwork and the involvement of students in field courses have a rich history in the discipline. In fact, the importance of fieldwork had been established long before Carl Sauer (1956: 296) famously declared that “the principal training of the geographer should come, wherever possible, by doing fieldwork.” Equally rich over the years has been the cornucopia of efforts that have sought to refine and improve the student experience in field courses. These efforts have taken aim at defining fieldwork, enhancing critical thinking, taking an ethical approach in the field, and separating the geographic research experience from that of the tourist.

This study convincingly demonstrates the importance of pre-planning and the need for course leaders to know both their student enrollees as well as their destination. While it may have been surmised that different student bodies would react differently to the field course experience, this study utilizes original research to effectively demonstrate statistically significant differences between student experiences in the field. Some of these differences are due to the location of the field course itself, others are due to the composition of the student participants, still others due to a combination of the first two factors. When preparing for a field course, the instructor can project which sets of skills are of most importance. The design of the course and the composition of the students may ultimately result in significant improvement in a particular skillset. Which skillsets are most important to the instructor, or most likely to be achieved through a particular field course, should be carefully thought out prior to the commencement of the course.

This study of six field courses over five years illuminates valuable findings that shed light on overall as well as course-specific benefits. From the six experiences, results indicate that the greatest self-perceived transformation amongst students falls in the General Category and the Geographic Skills category. In a comparison of field courses with a service-learning component to those without, several significant differences may be highlighted. In particular, those with service-learning show significantly higher scores related to values in life, taking initiative, and learning how to negotiate. In contrast, the non-service learning courses reveal significantly higher scores in such skills as time management and field methodologies. These are important findings and should be carefully considered by the instructor when developing the framework of a field course. Lastly, the field courses where students were taken to a country with a different language, ethnicity, and way of life, reveal significance associated with knowledge of regional geography and appreciation for local culture.

In sum, this study has quantitatively demonstrated that the type of field course and the type of students involved will have a profound impact on the areas of student success. While confirming what may have been anecdotally expected, this research serves to fill a gap in the assessment literature. Careful pre-planning on the part of the instructor will help to ensure that learning outcomes are appropriate and that the students' maximum potential can be realized. Suggestions for future research include exploration into the differences infused by national education systems as determined by the number of geography and environmental studies courses required of students. Moreover, why some skill sets that previous research has demonstrated influence, have seemingly little impact here, such as problem solving or information skills. Why service-learning impacts some more than others also deserve further analysis. These avenues of potential future research would serve to further augment the findings of this research and promote development of field courses that maximize student potential.

Acknowledgements

This project was supported in part by funding from a Keene State College Faculty Development Grant.

References

- Aitchison, J.C. & Ali, J.R. (2007). Tibet field camp as a 'roof of the world' capstone experience for earth science majors. *Journal of Geoscience Education*, 55(5), 349-356.
- Bond, L., Koont, S., & Stephenson, S. (2005). The Power of Being There: Study Abroad in Cuba and the Promotion of a "Culture of Peace." *The Interdisciplinary Journal of Study Abroad*, 11, 99-120.
- Boyle, A.P., Ryan, P., & Stokes, A. (2009). External drivers for changing fieldwork practices and provision in the UK and Ireland. *The Geological Society of America, Special Paper* 461, 313-321.
- Boyle, A., Maguire, S., Martin, A., Milsom, C., Nash, R., Rawlinson, S., Turner, A., Wurthmann, S., & Conchie, S. (2007). Fieldwork is Good: the Student Perception and the Affective Domain. *Journal of Geography in Higher Education*, 31(2), 299-317.

- Carlson, A. (2002). Authentic Learning: What Does it Really Mean? Center for Instructional Innovation and Assessment, Western Washington University. Updated 3/9/2013. Downloaded from: http://pandora.cii.www.edu/showcase2001/authentic_learning.asp. on 2/9/2013.
- Chatterjea, K. (2012). Use of Mobile Devices for Spatially-Cognizant and Collaborative Fieldwork in Geography. *RIGEO: Review of International Geographic Education Online*, 2(3), 303-325.
- Conrad, C. & Dunek, L. (2012). *Cultivating Inquiry-Driven Learners: A College Education for the 21st Century*. Baltimore, MD: Johns Hopkins.
- Dummer, T.J.B., Cook, I.G., Parker, S.L., Barrett, G.A., & Hull, A.P. (2008). Promoting and Assessing 'Deep Learning' in Geography Fieldwork: An Evaluation of Reflective Field Diaries. *Journal of Geography in Higher Education*, 32(3), 459-479.
- Fuller, I.S., Gaskin, S., & Scott, I. (2003). Student perceptions of geography and environmental fieldwork in the light of restricted access to the field, caused by foot and mouth disease in the UK in 2001. *Journal of Geography in Higher Education*, 27(1), 79-102.
- Garcia, C.V., Robertson, W.H., Loughheed, V., Tweedie, C., & Valasco, A. (2013). Journey to the End of the Earth: Academic and Professional Benefits for Students Participating in a Field-Based Research Program in Antarctica. *Journal of College Science Teaching*, 42(4), 72-81.
- Gonzales, D. & Semken, S. (2006). Integrating Undergraduate Education and Scientific Discovery Through Field Research in Igneous Petrology, *Journal of Geoscience Education*, 54(2), 133-142.
- Haigh, M.J. & Kilmartin, M.P. (1999). Student Perceptions of the Development of Personal Transferable Skills. *Journal of Geography in Higher Education*, 23(2), 195-206.
- Kelley, M.M. & Riggs, N.R. (2006). Use of a virtual environment in the Geowall to increase student confidence and performance during field mapping: An example from an introductory-level field class. *Journal of Geoscience Education*, 54, 158-164.
- Kent, M., Gilbertson, D.D., & Hunt, C.O. (1997). Fieldwork in Geography teaching: a critical review of the literature and approaches. *Journal of Geography in Higher Education*, 21(3), 313-332.
- Kneale, P. (1996). Organising Student-Centered Group Fieldwork and Presentations. *Journal of Geography in Higher Education*, 20(1), 65-74.
- Lathrop, A.S. & Ebbett, B.E. (2006). An inexpensive, concentrated field experience across the Cordillera. *Journal of Geoscience Education*, 54(2), 165-171.
- Lombardy, M.M. (2007). Authentic Learning for the 21st Century: An Overview. EDUCAUSE Learning Initiative, ELI Paper 1. Downloaded from: <http://net.educause.edu/ir/library/pdf/eli3009.pdf>. on 3/9/2013.
- Mistry, J., White, F., & Berardi, A. (2006). Skills at Masters' level in Geography Higher Education: teaching, learning and applying. *Planet*, 16, 9-14.

- Mullens, J.B., Bristow, R.S. & Cuper, P. (2012). Examining Trends in International Study: A Survey of Faculty-Led Field Courses within American Departments of Geography. *Journal of Geography in Higher Education*, 36(2), 223-237.
- Nam, Y. & Ito, E. (2011). A Climate Change Course for Undergraduate Students. *Journal of Geoscience Education*, 59(4), 229-241.
- National Service-Learning Clearinghouse. (2013). What is Service-Learning? Downloaded from: <http://www.servicelearning.org/what-is-service-learning>. on 6/9/2013.
- Pyle, E.J. (2009). The evaluation of field course experiences: A framework for development, improvement, and reporting. The Geological Society of America, Special Paper 461, 341-356.
- Riggs, E.M., Balliet, R., & Lieder, C.C. (2009). Effectiveness in problem solving during geologic field examinations: Insights from analysis of GPS tracks at variable time scales. The Geological Society of America, Special Paper 461, 323-340.
- Rydant, A.L., Shiplee, B.A., Smith, J.P. & Middlekauff, B.D. (2010). Applying Sequential Fieldwork Skills Across Two International Field Courses. *Journal of Geography*, 109, 221-232.
- Sauer, C. O. 1956. The education of a geographer. *Annals of the Association of American Geographers*, 46(3), 287-299.
- Service-Learning Workbook 1. (2013). Purdue University. Downloaded from: <http://www.purdue.edu/servicelearning/documents/workbook.pdf>. on 6/9/2013.
- Solem, M., Chueng, I., & Schlempler, M.B. (2008). Skills in professional geography: An assessment of workforce needs and expectations. *Professional Geographer*, 60(3): 356-373.
- Warner, R.M. (2008). *Applied Statistics: From Bivariate Through Multivariate Techniques*. Thousand Oaks, CA: Sage.
- Whitmeyer, S.J., Mogk, D.W. & Pyle, E.J. (2009). An introduction to historical perspectives on and modern approaches to field geology education. The Geological Society of America, Special Paper 461, vii-ix.
- Yang, D., Wang, Z., Xu, D., Wang, C., & Deng, Z. (2013). Chinese Junior High School Student's Perceptions of Geographic Fieldwork: A Case Study. *Journal of Geography*, 112(4), 156-164.
- Zamastil-Vondrova, K. (2005). Good faith or hard data? Justifying short-term programs. *International Educator*, 14(1), 44-49.

Appendix A

Field Course Survey

On a scale of 1-5, with 1 being Strongly Disagree and 5 being Strongly Agree, please rate the following categories.

(General Category)

1. My interest in Geography increased as a result of completing this field course. _____
2. My interest in taking other field courses increased as a result of completing this course. _____

3. My knowledge of regional geography increased as a result of completing this course. _____
4. I understood clearly the objectives of the course. _____
5. I understood what I needed to do in order to complete my research/presentation project. _____
6. I was able to accomplish all of the tasks needed to complete my research/presentation project. _____
7. I gained an understanding and appreciation of the local culture in my study area as a result of taking this course. _____
8. A field course is more useful than a standard classroom course. _____
9. The field course allowed me to more directly apply concepts I have learned in other geography classes. _____

On a scale of 1-5, with 1 being of Little Use and 5 being of High Use, please rate the following categories. Use NA if the category is Not Applicable in this circumstance. *This course:*

(Skills Management)

10. helped me clarify values in my life _____
11. helped me set goals in my life _____
12. helped me learn time management _____
13. helped me assess myself more clearly _____
14. helped me view issues from a different perspective _____

(Learning Skills)

15. taught me cooperation skills _____
16. taught me independence _____
17. taught me how to evaluate and implement a range of strategies _____
18. taught me how to be a team player _____

(Information Skills)

19. enhanced my skills in literature searches _____
20. enhanced my skills in information retrieval _____
21. enhanced my skills in information handling _____
22. enhanced my skills in referencing _____
23. enhanced my skills in public speaking _____
24. enhanced my skills in report writing _____
25. enhanced my skills in field methodologies _____
26. enhanced my skills in data recording _____

(Team Skills)

27. assisted me in taking responsibility _____
28. assisted me in learning how to take initiative _____
29. assisted me in learning how to negotiate _____

(Problem Solving Skills)

30. helped me learn more effective data analysis skills _____
31. expanded my ability for lateral thinking _____

- 32. helped me learn how to set questions clearly _____
- 33. helped me learn how to identify strategies _____
- 34. helped me learn how to evaluate success _____

(Communication Skills)

- 35. honed my reading/listening skills _____
- 36. enhanced my observational skills _____
- 37. helped me learn how to synthesize information _____
- 38. showed me effective self-evaluation skills _____
- 39. helped me utilize effective peer evaluation _____

(Geographic Skills)

- 40. enhanced my map reading/interpretation skills _____
- 41. allowed direct application of physical geography concepts _____
- 42. allowed direct application of cultural geography concepts _____
- 43. helped me solve fieldwork problems _____
- 44. provided me the opportunity to reflect on fieldwork _____
- 45. taught me how to keep a field notebook _____
- 46. taught me how to design field-based investigations _____

Biographical statements

Dr. A.L. RYDANT is a Professor of Geography at the Department of Geography, Keene State College, Keene, NH, USA. His current research focuses on field work pedagogy and student attitudes toward field experiences.

Dr. Christopher CUSACK is Professor of Geography at Keene State College in Keene, NH, USA. His work supports research opportunities for undergraduate students and he has previously published on issues of urban sustainability and regional development.

Dr. John P. SMITH was formerly Head of Environmental and Analytical Sciences, University of Wolverhampton, Wolverhampton, West Midlands, UK. His interests are in environmental change and management, and in curriculum development and skills sequencing in university level geoscience programmes.

Dr. Brian. A. SHIPLEE is a Senior Lecturer at the Faculty of Science and Engineering, University of Wolverhampton, Wolverhampton, West Midlands, UK. His current research interests concern environmental management, sustainability and climate change.

Dr. Bryon D. MIDDLEKAUFF is Professor of Geography and Environmental Science and Policy at Plymouth State University, NH, USA, and is interested in periglacial geomorphology in the Appalachians, biogeography of Eastern North America, and geographic education.