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Out in the Field: Experiencing a Research Learning Journey through a Community-Based Pilot Project

By Kimberly Maich and Carmen Hall

Abstract

Applied undergraduate degrees have become regular offerings at community colleges across Ontario, including the Bachelor of Applied Arts in Early Childhood Leadership and the Autism and Behavioural Science Graduate Certificate at Fanshawe College, both of which include coursework related to applied research. In collaboration with community agencies, this research project provided college students with practical experience in various components of research methodology, and explored their experiences in conducting research through the implementation of a peer-mediated social skills program with preschool-aged children with Autism Spectrum Disorders.

Introduction

Post-secondary student participation in research projects has been a long-standing practice in undergraduate and graduate settings. The majority of such research was conducted in university-based settings, where the practice has been extensively studied (Falconer & Holcomb, 2008; Kuh, 2003; Lopatto, 2010; Wayment & Dickson, 2008). However, community college settings have not traditionally engaged directly in faculty-led research, and regular opportunities and formal mentoring for students has been less commonplace. This current project aims to determine student perceptions and skills when directly engaging in research in a community college setting as well as examining these reflections within a potential framework of college student research learning.

Literature Review

The benefits of students conducting applied research in post-secondary educational settings have been highlighted with a long, robust history of previous data (Falconer & Holcomb, 2008; Kuh, 2003; Lopatto, 2010; Wayment & Dickson, 2008). The research literature has clearly presented a range of recent reviews and data-based research studies with community college students to doctoral-level research students (Lopatto, 2010). Weight (2010), for example, used a case study approach and detailed the anecdotal findings of one liberal arts college student and the impact of her involvement in a self-initiated research project. He found that this participation in an area of personal interest benefitted not only scholarly pursuits (e.g., fellowship) but that of her peers (e.g., further research), and the mission and values of the institution (e.g., grants). Weight noted that as well as the positive modeling that faculty-student interactions can provide for student researchers, students also report positive gains in understanding, and are exposed to experiences which develop critical thinking, empowerment, and a "lifelong thirst for inquiry and learning" (p. 9).

With a wider lens, Lopatto (2010) described his survey of students' self-perceptions of research in science research programs with the following notation: "Students benefit from academic-year research experiences and carry the benefits into the classroom" (p. 30). More specifically, he discovered various areas of benefits in disciplinary skills (e.g., data collection), intellectual skills (e.g., teamwork), and self-reported learning gains. He summarized his results with the following: "There is one more benefit of a good research experience that may be simply stated: a research experience helps one to be a better student" (p. 29). Falconer and Holcomb (2008) also examined self-perceptions of post-secondary students involved in a range of research projects and processes. They carried out a phenomenological study, in which 17 undergraduate students participating in summer research recorded their own learning growth through journal entries. Falconer and Holcomb discovered major themes within these student perceptions: success, pace setting, exposure and experience with other disciplines, relevance, stimulation, community, ownership, mentors, and scholarly experiences. Two overall categories were found that were again prominent for students' perceptions of their own growth through research experiences: social experiences (e.g., community building) and intellectual stimulus (e.g., relevance), along with academics (e.g., writing and speaking). These are all important to students in developing the perception of a positive research experience.

Wayment and Dickson (2008) looked beyond the immediate research experience to long-term and institutional benefits in research participation. They found that if the correct conditions are provided for establishing, sharing, and disseminating undergraduate research effectively, involving students in well-planned research experiences has a range of positive rewards. These benefits include increased enrollment, consistent acceptance into graduate study, and greater satisfaction with programs, faculty, and skill development.

Caporrimo (2008) identified a number of factors related to a positive research experience, such as: the need for high standards combined with flexibility; the generally high confidence in personal skills plus a need for approval. Overall, she noted that, "What many lacked in incoming academic skills, they made up in motivation, commitment, goal setting, a sense of humour, recognition of bias and discrimination in their lives, and strong convictions" (p. 34). She felt that the practical involvement in the academic task of research skills development is uniquely positioned to take advantage of these above-noted positive traits while also scaffolding development in related interpersonal areas.

Lastly, and with particular relevance for this research, Kardash (2000) described a taxonomy of research skills for undergraduate research experiences, developed through literature review, consultation, pre- and post-intervention skills ratings from undergraduates participating in a research experience, and mentor skill ratings of these undergraduates' skills. Kardash's taxonomy is not categorized, but rather lists a set of 14 research-related skills. For example, his taxonomy includes research-based skills from "understand contemporary concept in your field" (p. 195) to "write a research paper for publication" (p. 195).

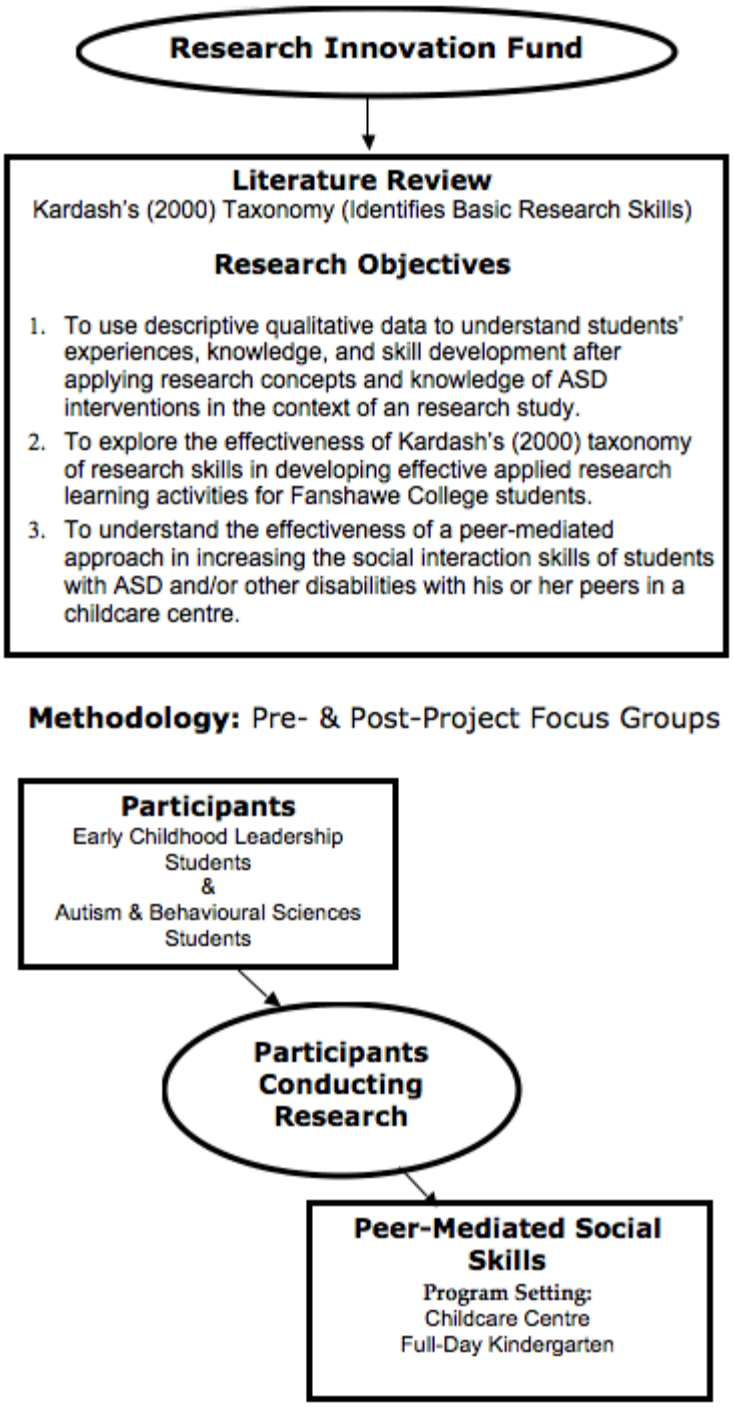
"Out in the Field" Project

Because Kardash (2000) argued that his taxonomy of research skills provided a first step to conceptualizing the development of research skills in an undergraduate research experience, this research tests Kardash's initial taxonomy as a framework for the development and measurement of applied research skills in community college students.

Two unique benefits of this research are, first, that participants at Fanshawe College who volunteered for this project had a hands-on research experience, and, second, they benefitted from the added experience of an immersion of significant pedagogical skills in their program areas. In order to measure the effects of hands-on research experiences for Fanshawe College students, a research topic was chosen to provide a research experience for this project which relates to the academic interests of both groups of students as described below.

In recent history, a major component of early childhood educational research has focused on the benefits of successful inclusion for children with disabilities in childcare centres (Robertson, Green, Alper, Schloss, & Kohler, 2003). However, environmental inclusion alone with typically developing peers is not significant to increase changes in social interaction in children with Autism Spectrum Disorder (ASD) without further intervention (McConnell, 2002). Peer-mediated interventions have been shown to be one of the most researched, effective methods for increasing social interaction skills in this population (McConnell, 2002). A peer-mediated approach involves teaching peers how to interact with the child with a disability, along with adult prompting in the application of these behaviours. Through this dual-purpose embedded research project, Fanshawe College student participants had the opportunity to evaluate the efficacy of their experience by applying classroom-based research skills in hands-on research activities; specifically, the instruction and measurement of a model of peer mediated social skills.

Figure 1. The embedded research project for participation of Fanshawe students.



Overall, the three main focus areas of this study are to: (a) use descriptive qualitative data to understand students' experiences, knowledge, and skill development before and after applying research concepts in the context of an applied research study; (b) explore the effectiveness of Kardash's (2000) taxonomy of research skills in developing a model of applied research learning activities for community college students in the Human Services field; and (c) understand the effectiveness of a peer-mediated approach in increasing the social interaction skills of children with ASD and/or other disabilities with their peers in a childcare centre. The former two topics are the focus of this paper.

Methodology

The study, which explores colleges students' experiences in applied research activities, uses a qualitative research approach, described by Glesne (1999) as a framework to explore and interpret "how the various participants in a social setting construct the world around them" in an emergent manner (p. 5). More specifically, this broad descriptor could be characterized as a descriptive approach to qualitative research (Creswell, 1998; Isaac & Michael, 1995).

In order to attempt to develop a taxonomy of research skills similar to Kardash's (2000) work that would be appropriate for college learning experiences, two focus groups were formed using focus groups of students within the Applied Research Methods course in the Bachelor of Applied Arts in Early Childhood Leadership and the Autism and Behavioural Science Graduate Certificate at Fanshawe College. These students were recruited, during two class presentations about this opportunity to participate in research, by a research assistant who used a prepared recruitment script. In total, the former class had 9 students and the latter had 26 students who were potential participants. Volunteers were invited to focus groups: both pre- and post-project completion. The pre-project focus group was facilitated by an informed and skilled research assistant from the local children's treatment centre who explained and gathered informed consent documentation and conducted the focus groups. The pre-project focus group was divided into two smaller groups due to the number of volunteers, according to availability and preference.

The audiotaped lengths of the two pre-project focus groups were 44 and 57 minutes long, respectively. The post-project focus group--audiotaped at 49 minutes in length--was conducted after the embedded project's intervention and data collection were both complete. Due to research participant drop-outs, only one post-project focus group was necessary. Focus groups were conducted using a semi-structured interview style focused briefly on demographics, and then focusing with more detail on the participants' self-reported research experience, knowledge, and skills. The semi-structured interview script was developed following related research and published literature on post-secondary students' research experiences. Both Hakim (1998) and Falconer and Holcomb (2008) indicated that the perspectives of students themselves are essential: "Written and/or verbal reactions of students involved in undergraduate research could prove to be as important for the improvement of the program as quantitative indicators" (p. 3). These audiotaped pre-project and post-project focus group interviews were professionally transcribed and reviewed collaboratively by the authors. Transcripts were reviewed, cleaned, and organized into segments using word processing software. A menu of colour codes was created as a tool for further organization and analysis. These segments were then recursively analyzed according to patterns and themes emerging from the words of the participants, with simultaneous comparison to existing research literature, and comments were added as necessary. Finally, these categories (e.g. hopes, preparedness, positive outcomes, negative outcomes, demographics) were synthesized inductively into an overall metaphorical theme: a journey (McMillan, 2012).

Participants

Participants in the pre-project focus group (January 2011) consisted of five students enrolled in the Autism and Behavioural Science Graduate Certificate, and four students enrolled in the Bachelor of Applied Arts in Early Childhood Leadership for a total of nine students. All students had previous academic and/or research exposure in previous academic diplomas and/or degrees required for entry into the current programs. The five students from the Graduate Certificate continued throughout the project and also completed the post-project focus group (April 2011).

Embedded Project

As this project involved college students' application of research methods and techniques into an educational setting, participants were offered a range of potential research roles as part of the embedded research project focused on the development of social skills in children with ASD (e.g., literature review, surveys, interviews, data collection, analysis, etc.). Their chosen area would fit into their area of interest and availability; some, for example, collected data for the embedded quasi-experimental, one-group pre-test post-test research approach in their application of research skills (Isaac & Michael, 1995). However, this embedded project itself is not part of the results used in this phase of data analysis; rather, this paper focuses on the experiences of the participants who implemented this embedded project. This study received approval from the Fanshawe College Research Ethics Board and funding from Fanshawe's Research Innovation Fund.

Results & Discussion

At the conclusion of each of the focus groups (pre- and post-project), audio recordings were transcribed, and themes emerged during data exploration. As a result, a metaphor of research as a "learning journey" clearly emerged, with five related themes strongly indicated. These themes characterized the research-related learning journey as one of (1) "keen anticipation," (2) leading "into the unknown," (3) with great "potential and possibility." In addition, this journey is seen as involving both (4) "hands" (i.e. technical skills) as well as (5) "hearts and minds" (i.e. personal, social and intellectual growth).

Research Applications as a Journey

(1) A journey of keen anticipation.

In a qualitative study of the perceptions of community college students, Caporrimo (2008) felt that even if students faltered in academic or research skills, this could be compared to what occurs in the development of novice research skills as a typical process of growth. It was felt that whatever students lacked, though, in skills, "they made up [for this] in motivation, commitment, goal setting, a sense of humor, recognition of bias and discrimination in their lives, and strong convictions" (p. 34). Caporrimo's summary demonstrates characteristics which were reflected in the participants' research journeys; participants in this small project also had keen insight into personal characteristics they felt would benefit the research. With such insight, one participant noted her learning style this way: "I think I'm analytical and professional … and interested, I think that's important. Interested and keen to know [and] to learn." In general,

participants believed they were well-positioned to utilize theoretical knowledge learned or being learned in research course work with this hands-on participation in this embedded project. As a group, despite feeling concerned about a lack of preparation, participants mentioned a range of ways in which previous research skills could help to guide their future success. Overall, the beneficial skills derived from their prior research journeys included: dealing with people; having domain-specific knowledge of the upcoming projects, as well as knowledge of children; studying research; reading research; observation; writing; teaching; critically analyzing research; participating in research as a participant; data collection (i.e., validity and reliability); proposal writing; drawing conclusions; knowledge of research-related terminology (e.g., funding, methodology); basic statistics; understanding ethical boundaries; working with others; and honesty or lack of bias. Positive anticipation combined with concerns about the journey into the unknown was a common theme articulated by these college student participants. However, during the post-project intervention focus group, one participant laughingly reflected that if she had known what she knows now (i.e., time commitment), she probably would not have agreed to participate.

(2) A journey into to the unknown.

During the pre-project focus group, an underlying thread of concern emerged. As a group, these pre-intervention focus group participants could be described as fairly novice to the field with few experiences in research (e.g., two had taken part in research as participants; two had taken part in data collection). Upon self-reflection on a scale of one to five, with a "five" rating "intensive preparedness" for research, only one participant in nine gave a self-assessment above three when asked about current level of research skill and knowledge about research skills. This one participant went beyond this typical norm and shared that, "I feel pretty comfortable walking into any kind of research setting where I would have to work to help a team to come to a conclusion of some sort. I choose four." However, as a group, participants were interested in participating in a research project, but were concerned about knowing—or not knowing—the specifics of their upcoming school activities or specifics of the involvement in the embedded research project. They were also concerned about their involvement in the focus groups themselves. This makes sense when placed in Kardash's (2000) framework of competence being defined through experience rather than an inborn ability. Our participants were—for the most part—not experienced enough to yet define themselves as competent or experts in research.

One participant described what she thought of as a lack of preparation for participation with the logistical details of this research project. She shared, "To me, research is a precise factual play-by-the- rules kind of thing. Yet, this part seems like there are no rules, and I don't know what's going on, and I don't know when it's going to happen." The concerns of two others focused on their emotional response to participation. One shared: "Personally it's a little bit intimidating that [what] you perform or say … [is] going to be possibly published for other people to read … even though it's confidential and not identified, it's still a little bit nerve-wracking." Another participant expressed concerns about how a potential lack of preparation could have a potentially negative impact on research results. She said: "I

would like anything that I do when it comes to this research to be extremely valid and reliable and ... not be skewed in any way just because of lack of knowledge." Although much of the concern here seems logistical and skills-based, it may be relevant that participants may fear being isolated in a context where they do not yet feel fully competent. This seems congruent with Kardash's (2000) core assumption that learning is a social process, where they need a strong sense of mentorship assurance and/or supervisory expectations in this process, which Falconer and Holcomb (2008) discovered, were vital. Caporrimo (2008) provided a possible direction for supporting community college students:

> From the perspective of community college faculty, they must continue to provide a nurturing and supportive environment for their students. However, faculty must concurrently hold high standards for student performance and prepare them … in psychological terms, they must behave like authoritative parents—setting limits and guidelines and demanding appropriate behavior while being flexible and caring. Neither an authoritarian approach, strictly focusing on the enforcement of rules and regulations in a non-nurturing environment, nor an indulgent approach, characterized by too much freedom and a few guidelines, will serve to the students' advantage. (2008, p. 35)

In this research project, the various research roles presented for participants to choose from depended on their availability in terms of personal, professional, and academic responsibilities. One of the supports provided to participants throughout the process in the hopes to mediate this journey into the unknown was the provision of "Tip Sheets" (see Figure 2) to assist in the logistical concerns around task completion. Figure 2 is an example of a tip sheet for the role of assisting with information-gathering for the literature review related to this project. It was specifically developed for the participants in this project to help guide their completion of the research tasks selected for this project. However, given that all participants who selected this task did not complete it, it seems that the anxiety around the "unknowns" expressed by participants is not just logistical, and that their participation needs more support than simply the provision of a task-analyzed information guide.

Figure 2. Tip sheet for literature review research contributions.

QUESTION:
I have chosen to contribute to this research project by assisting with a "Literature Review." What do I need to do?

ANSWER:
A literature review is an important and essential piece of the research process. Leedy and Ormrod (2010) describe eight different ways in which the literature review is essential and describe it as a "'look again' … at what others have done" (p. 66).

For the purposes of "Out in the Field," literature of the following topics is essential:

- Post-Secondary Students and Research Experience

- Preschool Children and Disability Awareness (i.e., simulations, bibliotherapy, role plays)
- Social Skill Training in Preschool Children with ASD
- Peer-Mediated Strategies in Social Skill Development in Schools

Your role is to choose one or more of the topics, find approximately three to five (or more) scholarly, peer-reviewed and research-based journal articles. From any time between the beginning of the Winter 2011 term to the end of April 2011, you can submit information to the principal researchers in the style of an annotated bibliography. You can submit information one article at a time, or when you are finished your search. How much time you spend and how many articles you find and summarize is up to you! The above numbers are simply a suggested guideline.

Information provided through your submissions may or may not be used in the final versions of any publications or presentations related to this research project.

If you wish, you can use this research as part of the major Research Project if you are enrolled in ECED 7003: Applied Research.

Finally, remember that participation in this research project is voluntary and that you may choose to withdraw at any time.

QUESTION:
What is an annotated bibliography and how do I write one?

ANSWER:
The OWL Purdue Online Writing Lab is a resource suggested by the Fanshawe Library. This site has a good overview of annotated bibliographies (http://owl.english.purdue.edu/owl/resource/614/01/) to assist you in your contributions to this project.

An annotated bibliography, first, has a APA-style bibliographic reference of the paper you have chosen to review. Then, a paragraph or a few paragraphs of information follow. OWL Purdue describes the annotations to the bibliographic references this way:

[It] includes a summary and/or evaluation of each of the sources … your annotations may do one or more of the following:

Summarize: Some annotations merely summarize the source. What are the main arguments? What is the point of this book or article? What topics are covered? If someone asked what this [article] is about, what would you say? The length of your annotations will determine how detailed your summary is.

Assess: After summarizing a source, it may be helpful to evaluate it. Is it a useful source? How does it compare with other sources in your bibliography? Is the information reliable? Is this source biased or

objective? What is the goal of this source?

Reflect: Once you've summarized and assessed a source, you need to ask how it fits into your research. Was this source helpful to you? How does it help you shape your argument? How can you use this source in [a] research project? Has it changed how you [thought] about [this] topic? (Bisignani & Brizee, 2010, para. 3)

Please contact the below co-investigators with any questions, concerns, or with your annotated bibliography.

[contact information inserted here]

Wayment and Dickson (2008) noted that one barrier to undergraduate research experiences was the lack of time given to supervision in faculty's work load calculations. Hunt, Mehta, and Chan (2009) reflected on graduate student's experiences as a dichotomy between isolation and uncertainty. One participant did reflect that the post-project focus group helped, as a form of group debriefing. She shared that "If I didn't have that experience [the focus group] to kind [of] debrief like this, or share at any point, I don't think that it would have been as meaningful." Perhaps, as expressed by the above participant, support for the uncertainly of participants in a research study needs to be a social and emotional nurturing, mentoring, and/or coaching, rather than a sole focus on skills development.

(3) A journey of potential and possibility.

Murtonen, Olkinuora, Tynjala, and Lehtinen (2008) note that skills related to research and statistics are applicable in varied contexts with a range of potentially positive life and work outcomes. For example, such skills are relevant, generally, to the context of our strong information-based society, and more specifically, to the pursuit and development of thinking skills and knowledge development. Pre-project focus group participants in this research, similarly looking ahead to potential outcomes, had many ideas as to what these potential outcomes of this research may be for their own life and work. As a group, they shared some specific examples of potential experiences they sought, from practical logistics of implementing and planning a research project (e.g., data collection), to professional skills development (e.g., advocacy) and such higher-level cognitive skills (e.g., critical understanding. Applied research has, unsurprisingly, an applied, hands-on focus for college students. The participants in this research did value the potential of this applied piece, but also much more: a journey of not only hands, but hearts and minds as described below.

Many positives which fulfilled hopes for research participation were expressed by participants in the post-project focus group conversation. Following the completion of the embedded research project, when directly asked which outcomes were perceived by them as the most positive, participants focused not only on a skills-based area (i.e., data collection) but also social/interpersonal areas (e.g., connections with others; reality of on-site research; viewing positive outcomes of interventions). An example is clearly summarized by one participant: "I'd say the most positive

experience would be the practical application and just ... being able to practice collecting data because this is one of the first times that I've been able to do so." A social/interpersonal connection was articulated in detail by another post-project focus group participant as:

> My positive experience was [seeing research] … come to life for me a little bit … it was very real and you're dealing with very real people and really real issues ... and seeing that was really great for me.

Looking back from the vantage point of the post-project comments shared by participants, certainly not all of the hopes and dreams of the expressed potential and possibility were realized for every participant. A few desired more than what they gained by the end of their planned involvement in the boundaries of this research project. For example, a majority of the participants in the post-project focus group expressed a desire to learn the practicalities of implementing the embedded peer-mediated social skills program, and others have expressed a desire to continue on with data analysis and writing following the completion of their chosen role in this research project, even beyond graduation.

(4) A journey of hands.

As already noted, Ontario's community colleges emphasize and value both research and instruction which translates into applied, practical skills for future employment (Fisher, 2009). Therefore, it is not surprising that most participants in this research expressed a strong interest in learning through hands-on, real-world experiences, as noted above. Kuh (2003) describes best practices in college pedagogy as meaningful, unique and transformative, with opportunities to "examine [students'] previous ways of knowing, thinking, and behaving" (p. 28). In terms of integrating research into the college curriculum, this transformation could appear, according to Kuh, even with a single faculty-student project collaboration. Of four choices of pedagogy presented to participants in the pre-project focus group, the application of skills was most commonly rated in the top two:

> The number one for me at this point in my life is definitely application of skills … that's why I chose to come to college, and … that's what I'm pretty much looking for out of every experience. Is how can I apply these skills into the real world.

However, many participants were wary of the idea of completely immersing themselves in potentially unpredictable settings, even with their underlying keenly expressed enthusiasm. A desire to be prepared was clear: "I'm more comfortable in a situation when I walk in kind of understanding what I'll be doing," and "I had application of skills as number one as well, but … I would definitely need to have some sort of knowledge before I feel confident in applying those skills."

One unexpected skills-based challenge which a majority of participants in the post-project focus group articulated was with the role change from education or clinical intervention models to that of a researcher; more specifically, a data collector. Two areas made this more challenging: the lack of familiar interaction with children in the research setting, and the new focus on the actions and interactions of a single child. For example, one post-project focus group participant shared that "the one child that we were

observing, he'd see that you're watching him and sometimes he'd just kind [of] stand there and look at you ... he knew you were there." However, the theme of desires for active participation remained prominent, even with these expressed concerns. Throughout the post-project focus group, participants also noted a range of benefits related to both skills-based development, typically related on-site tasks or what Hu, Kuh, and Li (2008) categorize as science and technology skills (data collection, on-site research, understanding of the research process) and vocational preparation (experience, professionalism). One participant reflected on her technical skills growth this way: "The practical application and the ability to practice your skills, so it's really ingrained, because it's one thing to … be taught within a classroom environment and then be out in the real environment." Another reflected on her growth in vocational-related skills like this:

> I think [this opportunity] offers [college students] more confidence in volunteering for positions like this and putting themselves out there to gain the experience because it's volunteer, there's not really any high expectations with it ... you do what you're taught and you follow through and then after you can reflect and see if that's something you would want to do in the future and ... for me it was a really interesting thing because again… in this program you look at a lot of research articles, and you talk about a lot of research articles and you see the results, but you don't see the data collection being done, so I think it backs up a lot of the things we learned in class and.... and gives them a lot of validity.

A common thread still was the desire for even more growth: to see what comes beyond the data collection or what surrounds it, the context; the outcomes.

(5) A journey of hearts and minds.

Participants went beyond including active implementation of research skills in their hopes, and considered the importance of learning beyond themselves, the moment, and their own sphere of influence. Kuh (2003), in his overview of the US-based National Survey of Student Engagement, asserted that involved, engaged, productive students, such as the participants in this research study, are "developing habits of the mind and heart" (p. 25) that support lifelong personal and academic growth, or that of an "educated person" (p. 28). One participant in this study clarified a similar combination of desires:

> I have a lot more skills I'm hoping to develop. I'd like to be able to take effective data … and have the ability to interpret it effectively to others … I understand taking the data; I want to learn how to turn it into something … graphs and give others that information … so I'm not just sitting there taking data and then just handing it off … I'd like to learn how to … interpret it. And have everyone else understand what we found.

Another focused on the potential for a long and strong influence beyond simply the immediate learning and self-focused skills development: "It's just gaining experience and ... being able to reflect on this after and seeing … what I might do differently in the future and how this could impact

my career, or my future education. A third saw this very participation as a self-defining experience:

> I know when I was in university that I didn't necessarily think it was unimportant, but it wasn't an area that I was interested in and I never conducted my own research. Whereas now it is something that really interests me and I think... it really defines individuals as professionals set apart from others by having the opportunity to participate or to conduct research.

This expression of desired real-life applications and self-development fits two of Kardash's (2000) core assumptions as research being meaningful when it is a combination of "active, constructive, and self-regulating" (p. 192) contextualized experiences. Links between research skill development and the workplace are interrelated; Murtonen, Olkinuora, Tynjala, and Lehtinen (2008) also found that students perceived the relevance of research skill to future employment.

Confidence was a strong outcome of participation in this embedded research participation.

> I think the word data, to me, not being a mathematical person, is a very intimidating word … and in the past when I thought of collecting data and analyzing data ... maybe some other algebra things jumped into my head and I was all freaked out and I think this... took some of the fear out of it. And just going back to the confidence aspect just ... really helped to... solidify my confidence level.

A sense of pride in their accomplishments was also well-represented in focus group reflections. To explain her sense of pride in this new role, one participant responded this way to questions about her participation in the embedded research project:

> I felt like ... a professional saying that ["We're collecting data'] … but also to parents that I work with … they've asked … "Oh, you get to participate in a research project?"... I believe it makes me feel more of a professional.

Another shared that:

> It's good to look back and [see that it's] not something I just handed in for marks … something you can look back and reflect on and be like, "Wow, I really did that," and, "Look where it happened." I took data but... it was still a part of the whole, and this is what came out of it. It would be nice to look back on that some day.

Finally:

> I really do feel proud to be a part of something like this and [it] validates the program and it validates everything I've put into this program and at the end of the day I can go, "This is something I accomplished."

Recommendations

It is interesting to consider that these two areas of strong outcomes shared by participants in the five-student post-project focus group, that of confidence and professionalism, do not fit as well within the framework of Kardash's (2000) taxonomy of research skills as anticipated. Kardash's taxonomy of 14 research skills has been self-described as an initial step to understanding how well research experiences support skill development. While it addresses skill development well, it does not address the personal growth areas—the hearts and minds—which also may be impacted with participation in research experiences at the undergraduate level. For example, the top two skills Kardash found that research interns rated as having the most growth in their research involvement were "observe and collect data" and "statistically analyze data" (p. 194). Most other items fit in with what would be categorized as technical skills in other, related models (Hu, Kuh, & Li, 2008).

Overall, some benefits reported by this group of student participants did not fit well within Kardash's (2000) skill-focused taxonomy. The framework provided by Hu, Kuh, and Li (2008), with its five general categories addressing development beyond technical skills of Kardash's model, seems to be a better fit with the perceptions of these participants who are also interested in—and celebratory of—their range of benefits gained in developing a model of applied research learning activities. See Table 1 for a comprehensive listing of the benefits in research participation as expressed by the participants in this study, framed within the work of Hu, Kuh, and Li.

Table 1 College students research participants' post-intervention perceptions of their experiences, knowledge, and skill development within the framework of Hu, Kuh, and Li (2008)

General education	• Deep understanding
Personal development	• Attention • Confidence • Focus • Multitasking • Patience • Pride • Time management
Science and technology	• Data collection • Observing positive outcomes of research • On-site research • Understanding of the research process
Vocational preparation	• Experience • Professionalism • Networking
Intellectual development	• Analytical ability • Critical thought

The literature and the reflections of the participants in this study are

clear for this group of students: participating in applied research at the undergraduate degree level in community colleges is a valuable learning experience. However, such participation may not be valued, prioritized, or perceived as possible by all those who would potentially benefit. Caporrimo (2008) noted that students have many issues related to work and family obligations that may impact on personal (e.g., confidence), even physical (e.g., tiredness) readiness for academic engagement and success and may enter the college system needing direction and support. During the course of this study, similar circumstances tended to be present that affected participation.

All four participants from the Bachelor of Applied Arts in Early Childhood Leadership program withdrew and did not complete their chosen research project tasks. Conversely, all five participants from the Autism and Behavioural Science Graduate Certificate were retained and completed their chosen research tasks and two of these expressed interest in continuing to complete data analysis and writing phases of this project. Perhaps, participants who dropped out of this research project participation may have experienced one of the above constraints. Another consideration may have been the perceived relevance, or a connection between the research activity and their interests and to see a project as worthy of their time. Since the graduate certificate students were able to complete the hands-on data collection in childcare settings with their peers, it may have increased the perceived relevance or mentorship, whereas the Bachelor students were working individually on the literature review. Perhaps, as Lei and Chuang (2009) noted, there were students for whom this particular project or research in general "does not generate excitement or curiosity" (p. 238).

Conclusion

This small group of five student participants entered into this research project with a keen desire, but were also apprehensive around what to expect in this new learning process. Students who participated in on-site research roles both desired, and achieved, a range of positive skills and personal gains throughout this project. It is clear that being "out in the field" makes a difference to a movement beyond interest alone to accomplishment through participation, even with logistical and personal constraints on that potential participation. The application of research skills allowed these students to understand concepts more clearly and takes the anxiety out of the unknown.

This project highlighted that—for this group of students in this particular setting—that student research participation requires adequate amounts of guidance, information sharing, and mentorship from faculty. This process, in theory, would allow students to feel supported, perhaps taking the apprehension about what may appear to be an intimidating process. In addition, this group of participants experienced a range of skills and other personal gains from the areas of research they completed. In order to link the process together, these students may have needed to be involved from the beginning to the end of a research experience. In order to create a more amenable environment for participation in hands-on research, college allocation of faculty time may need to be considered. In order to develop rich faculty mentoring, which may increase the comfort and benefit of students participating, research would likely need to be an

ongoing, accepted, and administratively supported legitimate part of the faculty's workload, a change in what Fisher (2009) categorized as "institutional mechanisms" (p. 20). Fisher noted that in terms of research personnel, a necessity for the adoption of an applied research culture, some issues need to be considered:

> College faculty are employed as full time teachers, with no expectation and, with rare exception, no accommodation in provincially negotiated collective agreements for faculty release time to conduct research. This lack of faculty release time, especially in the current economic context of competing demands for ever-scarcer resources, presents the single greatest barrier to building a sustainable research culture at Canadian colleges. (p. 20) [emphasis in the original]

In addition, research innovation funds, like the one supporting this research, are only intended as short-term supports with specific guidelines for completion within a term of study (Centre for Applied Research, Innovation & University Partnerships, 2010). To provide more logistically sound, lengthier and more in-depth research experience which has the potential to involve students in a wider range of research roles not possible in the time frame of this project, funding that allows for this further flexibility would need to be obtained externally.

Due to the reports of personal gains from the group of participants in this interview, including the reports in increased confidence throughout this project, it is important to consider how engaging students in research is a part of the entire academic experience. In the past, researchers such as Kardash (2000) have focused on primarily skills-based outcomes of student research participation. The results of this study demonstrated the personal growth as well, and is better framed within the work of Hu, Kuh, and Li (2008) who divided potential self-report gain factors from inquiry-based college-level activity into five general categories, all of which were articulated by the participants in their post-project focus group contributions. In addition to technical skills discussed earlier, other categories included personal development (time management, patience, attention, focus, multitasking) and intellectual development (critical thinking and analytical skills), participants expressed one area of general education (deep understanding) and two strong areas of personal development: confidence and pride. The gains with the application of theory-based research skills learned in classes along with the personal skill gains by participants, demonstrates the need to enhance opportunities for student research participation, to complete the community college model of applied learning across many areas of instruction.

Future Research

This project expanded on other frameworks to understand college student's perceptions in applying research; however, the number of participants was limited, and the number of participants who did not complete the project was significant. Future research needs to fully understand how these various types of experiences may fit within the traditional applied learning settings of community colleges. For example, it would be interesting to investigate if there are seminal times in which students can benefit from being involved in research. Students in this

project had previous academic study before their current programs, and thus had more maturity and applied experience. This differs from some of the direct-entry programs from high school, where students have fewer such experiences. While Kardash's (2000) 14-point taxonomy described many of the benefits of integrating applied research activities into college programs, Hu, Kuh, and Li's (2008) 5-point framework was found to more accurately and fully capture the students' reflections on their experiences, and could possibly provide a more appropriate teaching, learning, and research model for future project-based involvement incorporating applied research activities at the college level.

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Dr. Kimberly Maich, PhD, OCT, is a professor at Fanshawe College in the Bachelor of Applied Arts in Early Childhood Leadership.

Carmen Hall, MC, CCC, is the program coordinator of Fanshawe College's Autism and Behavioural Science Graduate Certificate.

They can be reached at: kmaich@fanshawec.ca and clhall@fanshawec.ca

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