Managing Faculty-Student Collaborations In Research And Authorship

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ABSTRACT

The trend toward multidisciplinary research funding and partnerships brings together researchers with diverse perspectives. However, guidelines for effective supervision in multidisciplinary research are lacking. The New Canadian Children and Youth Study is described as an example of multidisciplinary, multi-site research involving researchers and students in a variety of roles. The benefits and potential difficulties of multiple authorships are reviewed in light of faculty-student collaborations. Three hypothetical vignettes illustrate research issues and considerations to be made by both faculty and students. Recommendations are outlined for ethical practices in determining authorship contributions in faculty-student research collaborations.

RÉSUMÉ

La tendance à financer la recherche multidisciplinaire et les partenariats qu'elle suscite rassemble des chercheurs de divers horizons. Toutefois, ce domaine manque de lignes directrices pour une supervision efficace. La *New Canadian Children and Youth Study* est décrite comme un exemple de recherche multidisciplinaire multi-sites à laquelle chercheurs et étudiants contribuent à divers titres. Les avantages et difficultés possibles des paternités multiples sont étudiés sous l'angle des collaborations entre professeurs et étudiants. Trois vignettes hypothétiques illustrent les enjeux et les considérations dont ceux-ci doivent tenir compte. Des recommandations déontologiques pour déterminer la paternité des contributions dans les recherches menées en collaboration par des professeurs et des étudiants sont présentées dans leurs grandes lignes.

There is a growing trend in research funding and partnerships toward multidisciplinary and multiple researcher collaboration (Erlen, Siminoff, Sereika, & Sutton, 1997; Holaday & Yost, 1995). This trend brings together professionals

with diverse perspectives about the nature of topics under inquiry, the methodologies that inform research, and the ways that research projects should be managed. Despite the trend toward multidisciplinary research, little attention has been paid to issues that support its success or pose as barriers to its success. Faculty members may not have received any formal supervision training, and most professional education programs do not include curriculum about research roles, relationships, and the ethics of publication (Jones, 1999). An area of potential conflict is authorship of scholarly work, including who receives author status and the order of authors (Fine & Kurdek, 1993; Goodyear, Crego, & Johnston, 1992). Both faculty and students need to be informed about ways of managing authorship issues that emerge from collaborative research.

Professional codes of ethics offer general guidelines about managing authorship. For example, the Canadian Counselling Association's (1999) Code of Ethics addresses research contributions in the following way: "Counsellors give due credit through joint authorship, acknowledgment, footnote statements, or other appropriate means to those who have contributed significantly to the research and/or publication, and to those who have done previous work on the topic. For an article that is based mainly on a student thesis or dissertation, the student is listed as principal author" (p. 19). Similarly, the Code of Ethics of the American Psychological Association (2002) states, "Psychologists take responsibility and credit, including authorship credit, only for work they have actually performed or to which they have substantially contributed" (p. 12). What is apparent from professional codes of ethics is the need to ensure that all contributors to professional research, including students, are given appropriate credit. However, determining what constitutes a "significant contribution" is a challenge, as ethical guidelines are open to interpretation.

The purpose of this discussion is to outline considerations for managing multiple authorships within multidisciplinary research projects. Focus is placed on issues of faculty-student collaboration. First, the trend towards multi-site and multidisciplinary research is discussed. Second, as a context for the authors' experience with collaboration, the New Canadian Children and Youth Study (NCCYS) is introduced. Third, it is timely to articulate practices that support interdisciplinary research, as members of the counselling psychology profession increasingly work together with colleagues from other disciplines.

Trend toward multidisciplinary research

In Canada, the trend toward multidisciplinary research continues and is gaining momentum. One look at the federal research funding agencies' requirements for research (e.g., SSHRC, CIHR, NSERC) indicates the importance of multidisciplinary collaboration. Increasingly in the area of health research, such collaboration is not an additional option but a requirement for the proposed study. The proliferation of discourse in multidisciplinary research has been followed by the creation of research teams that consist of multiple

researchers from different disciplines. With growing access in Canadian universities and research institutes to the Internet and availability of instant communication through electronic mail, it is possible for multidisciplinary research teams to be composed of members in different cities and different organizations within those cities. One example of multi-site and multi-disciplinary research is the NCCYS. All authors are affiliated with the NCCYS in various roles, including the national co-ordinator, faculty researchers, and a former graduate student research assistant.

THE NEW CANADIAN CHILDREN AND YOUTH STUDY

The NCCYS is a longitudinal study of approximately 5,000 immigrant and refugee children living in six Canadian cities—Toronto, Montreal, Winnipeg, Edmonton, Calgary, and Vancouver. The project objectives focus on comparing the physical health, mental health, and psychosocial development of immigrant and refugee children aged 4–6 and 11–13 to that of the general population of Canadian children in those age groups. In addition, the project examines identity formation, the impact of migration and resettlement, and the impact of racism and discrimination on immigrant and refugee children and youth.

Metropolis is a national consortium of research centres involving Canadian universities dedicated to carrying out policy- and practice-relevant research on the topic of immigration and settlement. NCCYS is a joint initiative of four Metropolis centres—Montreal Centre for Inter-university Research on Immigration, Integration, and Urban Dynamics (IM), Joint Centre of Excellence for Research on Immigration and Settlement (CERIS), Prairie Centre of Excellence for Research on Immigration and Integration (PCERII), and Research on Immigration and Integration in the Metropolis (RIIM). The project consists of nine participating universities. A variety of disciplines are represented on the research team including applied human sciences, anthropology, biostatistics, counselling psychology, community health, demography, education, epidemiology, family studies, medicine, nursing, political science, social work, and sociology.

There is student involvement at all levels of the research project, including a postdoctoral position, and graduate students at the master's and doctoral levels hold positions such as interviewers, research assistants, site coordinators, and the national coordinator. In addition, opportunities are available for students from outside the project team to use secondary data from the project for thesis or dissertation research.

As a result of the complex nature of the project and the need to ensure that all team members are adequately included, recognized, and acknowledged, an Intellectual Ownership Working Group (IOWG) was formed from within the project team to (a) develop principles regarding intellectual ownership of survey questionnaires and instruments, survey data, and data analysis; and authorship of publications, presentations, research reports, community presentations, public

lectures, media interviews, website documents, community newsletters, press releases, public information materials, and public policy documents; and (b) suggest a process by which these principles should be implemented (Rummens, George, Arthur, Gagnon, & Mawani, 2002). The IOWG is made up of a representative from each project site and the national coordinator. Different levels of faculty researchers, including both tenured and non-tenured faculty, and students are represented in the working group. A particular focus has been placed on the roles and rights of students within the NCCYS. An extensive multidisciplinary literature search was conducted to inform the guidelines produced by the IOWG, and this literature was utilized to substantiate the points raised in this discussion of faculty-student collaboration in research and the dissemination of scholarly work.

Several issues were identified through the NCCYS project that led to discussion and debate about faculty-student collaborations within the project. These served as a springboard for the authors of this article to highlight issues that were project-related and relevant for faculty-student research relationships in other domains of academic research partnerships. A call for contributors to a paper on faculty-student collaborations in research was circulated to all members of the research team, with encouragement for participation by student members. This method models an open process for establishing collaboration and avoids some of the conflicts that can surface when subgroups organize for the production of scholarly work without informing research colleagues. The four respondents, including one student, worked collaboratively in the development of this discussion paper. Rather than using specific examples from the NCCYS research project that would potentially identify individuals, we chose composite examples and attempted to move the discussion to a more general level to illustrate key issues and to inform both faculty and student groups. It was hoped that this approach would be informative for managing faculty-student collaborations in a number of academic and research contexts, and encourage discussion about guidelines for professional disciplines that have common issues. This is the first collaborative manuscript to be produced from the NCCYS project. We wanted to "test our understandings" about how collaborative authorship on a multidisciplinary research project could work and share some of our ideas that emerged through this partnership.

Implications for Student Involvement

Multidisciplinary research can entail various levels of student involvement and provide innovative learning opportunities. Such opportunities would, in part, be determined by the following factors:

(a) the level of incorporation of student participation in the research as part of the study design (for example, through opportunities for postdoctoral and doctoral thesis focus, project coordination, and research assistantship);
(b) involvement of research team members in academic positions that entail undergraduate and graduate teaching;

(c) the scope of the study (including length of time and amount of data required for completion); and
(d) the student's current educational level (the nature of involvement for a doctoral student would vary from that of an undergraduate student given the different time spans for study, knowledge level, and previous research experience).

Student involvement on multidisciplinary research teams provides reciprocal learning opportunities. For students, ongoing exposure to diverse fields of knowledge, points of view and methods of research is available. For academic researchers, it necessitates mentorship that does not assume the same disciplinary language basis, methodological knowledge, or theoretical analysis among students. It requires the researcher to consistently learn from and about other forms of disciplinary knowledge. Learning from other disciplines, in turn, informs the incorporation of multidisciplinary content into course design that encourages critical awareness and taking multiple perspectives (Khanlou, 2003).

COLLABORATIVE AUTHORSHIP: BENEFITS AND HAZARDS

There are many benefits to collaboration between two or more people in research and publication. Oddi and Oddi (2000) summarize three positive features. First, faculty mentorship can support students to reach their academic and professional potential. Second, scholarship for both faculty and students is promoted. Third, academic professions gain from the contributions of both students and faculty. However, collaborative authorship can also be problematic and undermine professional standards. At the heart of these concerns is the issue of academic plagiarism—the unauthorized use of scholarly work or ideas from others without permission or appropriate acknowledgement (Goodyear et al., 1992).

Codes of ethics typically address authorship for publications based upon a student's thesis or dissertation. Literature is lacking regarding faculty-student collaboration on research projects that are independent of thesis or dissertation research (Jones, 1999). Although considerable mentoring takes place through "apprenticeship" on research projects, faculty members are cautioned against treating students as "cheap labour" (Conn, 1995). Due to the evaluative components of an academic program and due to their limited experience with research, students are considered to be in positions of lesser power and vulnerable to exploitation (Fine & Kurdek, 1993). It is the responsibility of faculty members to set clear boundaries and to protect students from exploitation, particularly when work on a research project has the potential for publication (Barretta-Herman & Garrett, 2000).

Four practices have been identified that raise serious concern about how collaborative authorship is managed (Oddi & Oddi, 2000). First, academic departments may have policies in place that deliberately or inadvertently mandate the inclusion of faculty members as joint authors with students. Even when

students are informed of policies in advance, this does not honour ethical imperatives that authorship should be assigned on the basis of contribution, versus automatic assignment to faculty.

Second, individual faculty members may establish their own set of rules for working with students and determining authorship (Oddi & Oddi, 2000). Conditions for authorship may be imposed as part of an agreement for supervision, participation on research projects, or signing off on thesis or dissertation research. Under pressure to "publish or perish," faculty members may be overly restrictive and apply conditions that do not allow for the individual research contributions of students to be properly acknowledged. Third, on a more informal basis, faculty members' "suggestions" to students about authorship must also be viewed in light of potential coercion and the inadvertent use of power. Even when faculty members provide choices to students about authorship, students may feel obligated to include their supervisors. This can be due to lack of knowledge about how authorship is determined, or due to fears about the consequences of not including their supervisors. Lastly, faculty members are cautioned about giving in to temptation when students offer to include them as "honorary" authors. Students may believe that including their supervisors in authorship is the protocol in an academic environment. Students may also want to include their supervisors in authorship as a required courtesy, or students may be motivated by hopes of future benevolence. In cases when students invite faculty members to co-author, faculty must decide whether or not their relative contribution merits authorship.

Little is written to offer faculty members guidelines about protecting their rights to due credit as supervisors in faculty-student collaborative research. Arbitrary practices exist about the conditions under which faculty deserve to be credited for their professional expertise about planning, conducting, and disseminating research. There is a certain degree of ambiguity in decision-making by faculty who insist upon inclusion of their name in authorship, versus decisions to support the independent work of students. These issues become even more complex in multidisciplinary research teams on large-scale research projects. For example, in the NCCYS, researchers other than a student's academic supervisor may have been involved in the conceptualization, implementation, data collection, and data analysis stages of research. Although some students may not have worked directly with those researchers, the contributions of all faculty members to students' work also need to be kept clearly in sight and given proper acknowledgement.

HYPOTHETICAL SCENARIOS

The following three hypothetical vignettes describe problematic or unclear issues related to collaborative authorship between faculty and students involved in multidisciplinary research projects. Brief descriptions of the ethical dilemmas along with how each scenario should be addressed are also provided. The issues

include: (a) the interpretation of substantial contributions, (b) the use of secondary data analysis, and (c) the intellectual property of the dissertation. The scenarios were created because they are well anticipated to arise in a multidisciplinary, multi-site research project. As previously noted, in the NCCYS, a sub-committee was formed to address these issues. For example, policy documents were drafted governing the way in which to acknowledge the contributions of the researchers' conceptualization of the project when students use data collected from the project for writing up dissertations, presentations, or publications. All members of the research team were invited to provide feedback in revisions of the policy documents.

Scenario One

A team of researchers involves two doctoral students in a project examining how young East Asian immigrants adjust to the Canadian educational system. Student involvement in the project includes assisting in the collection of data using instruments designed by the researchers and conducting the analysis of the data. The team plans to write an article based on the study for publication. However, no discussion takes place related to the order of authorship for publications resulting from the study. In the middle of data collection, one of the students comes up with an idea that he could use the same instrument to collect data from the Somalian community and then compare the results to the data collected from the East Asian community. All members of the team agree with the student's suggestion. The student collects the data, but one of the researchers conducts the comparative analysis. At the request of the researchers, the student writes the first draft of the comparative article, and the researchers involved in the study subsequently revise the manuscript several times. It is accepted for publication and the student is listed as the last author of the article.

Commentary. The guiding ethical principles that are relevant to this scenario include the intentions of all parties on the research team and revisiting the contributions of various members on a regular basis. The principle of intention refers to the desire among all parties involved to merge the contributions of the authors and should be discussed at the time of the creation of work (Oddi & Oddi, 2000). The researchers of the study have the intention to involve the student in the project. An initial plan regarding the contributions of each party to the project was established, but the participants did not address the order of authorship as part of this process. Students are usually listed as second authors because project ideas are owned by the researchers and because of differences in terms of the levels of contributions to the project. Ethical guidelines outlined earlier in the discussion suggest that authorship of articles should be determined by individuals' substantial contributions to the work. This scenario exemplifies the lack of clarity and how interpretations can be made about the term "substantia1 contribution." The scenario also exemplifies collaboration in a research project when the student is not involved in thesis or dissertation research. In this scenario, the work plan agreed to at the beginning of the project relating

to the contributions of all parties involved was based on good faith. However, as the work progressed, the contribution of the various parties changed. As a result, agreements pertaining to contributions to the research project and authorship need to be revisited. Members of the project need to monitor the contributions made by each author on an ongoing basis. Nevertheless, it is important to give appropriate credits for the research team members who were involved at the conception and earlier stage of the project, despite circumstances when the student might become increasingly involved and significantly contribute to the research project. Moreover, it is not uncommon for manuscripts to be revised substantially before they are accepted for publication. In this case the student wrote the initial draft of the manuscript, but substantial revisions were made before the piece was published.

Scenario Two

A doctoral student and her thesis supervisor are involved in a multi-site research study examining depression among new immigrants. The thesis supervisor of the student is the principal investigator of one of the sites, and his student would like to use the data collected from his own site for secondary data analysis to write up her thesis focusing on depression in immigrant women. After completing the thesis, the student's supervisor encourages her to write an article based on her thesis. However, another researcher from the project is the acclaimed expert in the area of depression in women. The thesis supervisor recommends that the student invite the acclaimed researcher to join as first author of the article, as this would contribute to the student's career. The student agrees, although she strongly believes that she is quite capable of writing the article herself. The second researcher agrees to take the role of lead author and subsequently, using some data from other sites, redoes the analysis. As a result of this process, a new section is added to the manuscript.

Commentary. The issues here involved paternalism and the use of secondary data analysis in a multidisciplinary research project. Based on the work of Oddi and Oddi (2000), the ethical principles of paternalism and justice are relevant to the authorship dilemmas presented in this case situation. Paternalism in this context refers to treatment of the student by the supervisor so that the student receives benefits that might not otherwise occur. As a result, the appropriateness of paternalistic behaviour in the authorship context depends on the student's level of autonomy and capability. In this case, the graduate student is able to finish the manuscript by herself. Even though she was consulted by the supervisor with respect to encouragement of the involvement of the acclaimed researcher in her manuscript, the consent by the student should be treated in a cautious manner. This stems from the student's involvement in an unequal relationship with her supervisor. In essence, the supervisor possesses power, and the potential impact on the student requires careful consideration.

Justice refers to the ethical duty to treat others fairly and to give individuals what they deserve (Oddi & Oddi, 2000). In this case, if the professional work of

the student is not considered to be meaningfully different from that of the supervisor and other researchers, then the authorship order should be on the same basis as those considered for colleagues who are faculty. Moreover, the student, as the owner of the copyright of the thesis, should be awarded first authorship for the preparation of the derivative work from the thesis.

Moreover, this scenario also involves the use of secondary data analysis in a multidisciplinary and multi-site research project. Standard guidelines should be formulated to require the supervisor to keep other project members informed in order to avoid any overlapping of the student's topic with those addressed by members of research teams in other sites. Also, even though the student might be the exclusive author of the thesis or the lead author of its derivatives, appropriate acknowledgements and credits should be given to the principal investigator, project manager of the site, and project members of other sites.

Scenario Three

Sarah, a doctoral student in counselling psychology, is in the process of completing her doctoral dissertation under Dr. Manga's supervision. Collaborating research scholar and Sarah's committee member, Dr. Smith, from a faculty of medicine at another university, is providing additional expertise for Sarah's project. Though strong in statistical analyses, Sarah does not feel very comfortable writing formally for publication. Sarah requires minimal assistance from her supervisor to complete data collection and analyses. Dr. Manga is due for a promotion and badly needs his student Sarah to complete her program. Following the completion of analysis by Sarah, Dr. Manga assumes a more active role in the writing of the final doctoral dissertation draft.[1] Sarah successfully defends her dissertation. Dr. Manga manages to get a modified and shorter version of the thesis accepted as a paper for presentation at a prestigious conference.

Though having done most of the writing, Dr. Manga considers Sarah to be the exclusive author of the dissertation and primary author of the paper extract. This would imply that Dr. Manga would be the coauthor of the paper borne out of the dissertation. The conference paper is received with wide accolades and is accepted for publication. Sarah, sensing that this seminal work might enhance her career, reconsiders the authorship. She convinces herself that while her supervisor had rewritten many of the sentences, all he had to was polish up the presentation; she had done all the work relevant to the content of the study and hence would be the only author. After all, it was her intellectual property with Dr. Manga's language. Dr. Manga is furious and decides legal recourse is the only viable strategy. To further complicate the situation, Dr. Manga and Dr. Smith, the research colleague at the other university, had employed Hussein, a graduate student, to create customized software that would address some of the specific needs of their funded research project. Under the supervision of Dr. Smith, Hussein had invested considerable time reviewing the study in order to create appropriate software. Hussein had also assumed that Dr. Smith had offered him the copyrights to the created software package. Hussein (having discovered the

popularity of his software package) decides to launch an appeal involving copyright infringement against Sarah and Dr. Manga—claiming reimbursement and demanding that he be included as one of the authors.

Commentary. Student research, particularly at the graduate level, often entails funding for students through an academic supervisor's research grant — even as the student utilizes the supervisor's (physical) space, materials, literature, advice, and ongoing review (Leyerle, 1986). The topic of specialty is usually the supervisor's area of expertise, and the student identifies a related research project involving data collection, analyses, interpretation and reporting. Students may also join one of their supervisor's research projects in progress. With considerable input to maintain established research standards, the supervisor provides reasonable guidance and allows the student to present the findings at a conference. Differentiating between *ownership* and *authorship* (DuCharme, Poplin, & Thomas, 1995), the supervisor believes in allowing the student to explicate research findings. In this scenario, Dr. Manga had secured funding for Sarah and provided space, materials and additional monies for development of the research tools. Dr. Smith and his research assistant, Hussein, had provided expertise and assistance in software design and development. Two faculty members in two disciplines at two universities working in collaboration with two graduate students had different assumptions and expectations.

How can we avoid this complicated and unpleasant situation? One simple but effective way to avoid this clash would have been to *eliminate the unknown* by establishing a written set of "responsibilities and duties agreed upon by both the supervisor and the student at the beginning of the program" (Chia, 1986, p. 64). These would be based on a clearly understood set of guidelines surrounding the issue of intellectual property, copyright, patent, and research ethics. In this scenario, Dr. Manga would list the expectations *in writing* and *before* beginning the research partnership. As Hussein was hired to develop the software and not to engage in the actual research activity, he would either have the option to quit the project without delving into the content area or to establish an agreement with his supervisor, Dr. Smith, doctoral candidate Sarah, and supervisor Dr. Manga regarding intellectual property and ownership. Sarah would recognize her limitations and thereby not be faced with unpleasant surprises. She had gained recognition as the sole author of her dissertation, but the paper extract involved her supervisor's contribution toward the publication. Finally, Dr. Manga and Dr. Smith would consult with department committees on ethics at their respective universities *before* proceeding with the project. In the case of multidisciplinary, multi-site research, guidelines for the overall project must take precedence. There will inevitably be disparities between how individual faculty members manage student supervision at each research site, within academic disciplines, and within specific academic departments. However, attempts at equitable standards can be supported through developing guidelines early in the developmental stages of projects and maintaining ongoing review of practices for the dissemination of related scholarly work.

These scenarios exemplify some of the complex student-faculty authorship issues that can emerge. Based upon the authors' collective experiences in working on the NCCYS and our review of the literature, we have selected a number of recommendations to inform faculty-student collaborations in research and authorship.

RECOMMENDATIONS

The following recommendations are intended to support ethical practices in the assignment of authorship credit in faculty-student collaboration.

1. Current practices in academic departments, including the issues inherent in student-faculty research collaboration, need to be vetted in an open discussion to identify potential pitfalls for both students and faculty (Oddi & Oddi, 2000). This may be especially useful for junior faculty members to be initiated into matters pertaining to supervision of research.
2. Students need to be educated about the ethical guidelines involved in research, including information about the publication process. This serves to inform students about the issues, rights, and responsibilities that they and their supervisors have in negotiating authorship. Guidelines regarding the issue of credit for authorship could be included in student orientation materials (Bartle, Fink, & Hayes, 2000). This kind of "public" document helps students to gain background knowledge and promotes more open dialogue about issues of authorship. In addition, presentations can be offered as part of student orientation sessions so that students are given information and have the opportunity to raise questions early on in a non-threatening forum.
3. During the early stages of multidisciplinary, multiple researcher projects, a subcommittee can be struck to address matters of intellectual ownership. This recommendation with the NCCYS led to the development of guidelines and a process for all members of the research team to follow in determining intellectual ownership and authorship to help to facilitate positive collaborations for all members of the research team. Attention to issues pertaining to students should be highlighted for special consideration within the guidelines (e.g., Rummens et al., 2002).
4. Faculty should consult their respective professional codes of ethics on student research and model those principles to their students in supervising authorship decisions (Jones, 1999). This includes instructing students about their ethical responsibilities in research and publication, issues of plagiarism, and how to properly assign credit for work conducted on projects involving multiple researchers.
5. It is the responsibility of faculty researchers to inform students about matters pertaining to the assignment of authorship. Students who are at the stage of being hired in research projects should be included in the discussions about how research roles and research credit will be allocated (McGue, 2000). Ideally, this sets the stage for clarifying expectations, and promotes

ongoing discussions and revision as research projects progress. It also encourages the involvement of students as collaborators in negotiating the tasks and contributions that warrant consideration for authorship (Fine & Kurdek, 1993). As specific scholarly projects unfold, such as the writing of a manuscript, the contributions of individual research team members need to be reviewed to see if the original agreements appear to be fair and equitable. This allows for the possibility of changes, both predictable and unpredictable, on research projects that necessitate shifts in roles, and helps the research team revisit their initial agreements in good faith.

6. Faculty must be cognizant of power differences inherent in supervisory relationships with students and how that can unduly influence decisions about the order of authorship. Faculty should strive to work with students in a collaborative rather than competitive or autocratic manner to ensure that students are informed and to facilitate an atmosphere of openness in discussing matters pertaining to authorship. Students should feel neither threatened nor embarrassed about raising questions or concerns about authorship and the assignment of credit for their work on research projects (McGue, 2000).
7. Faculty need to be clear with students about the expectation that they will give proper acknowledgement to the developers and funders of research projects. Students may be inexperienced in these matters and require advice regarding ethical and professional standards for acknowledging all stakeholders involved in large-scale multidisciplinary research projects. For the NCCYS, standardized statements of acknowledgement were developed for use with any scholarly work that emerges from the research.
8. Faculty must avoid letting their name be included on scholarly work as a matter of "honorary authorship" in return for supervision. Despite pressures to publish, the awarding of honorary authorship inflates academic credentials, takes credit away from other members of a research team, and is intellectually dishonest (Jones, 1999; Riesenberg & Lundberg, 1990). Conversely, students should not expect to be included as authors when their contributions to research projects have been technical assistance rather than contributions that are "scientific" in nature (McGue, 2000). This may be more complicated when research roles involve the "technical" side of data collection and analysis, yet some research methodologies (i.e., qualitative methods) require critical thinking during the stages of data collection and analysis. It also seems unfair for students who make major contributions to earlier stages of a research project to not be given opportunities to contribute to authorship.
9. Monetary compensation should not be considered as a substitute for authorship credit. For example, students may be paid as research assistants. Payment for services should be viewed as a separate issue. The emphasis on determining authorship in collaborative research should be kept on contributions of expertise (Fine & Kurdek, 1993).

10. A process for managing disputes about the assignment of authorship should be established within research projects. If that process is unsuccessful, consultation with a third party can help to resolve authorship disputes before they require formal adjudication (Erlen et al., 1997; McGue, 2000). On multidisciplinary research projects, it is advisable to have several people available that represent the respective disciplines.
11. Expectations about "substantial contributions" by students toward scholarly work must be viewed in light of the experience and expertise of students. It is not reasonable to set the same "benchmark" for student participation on research projects as for experienced professional colleagues (Fine & Kurdek, 1993). Consequently, decisions about authorship need to take into consideration what is reasonable to expect of students and be weighted in their favour. Priority should be assigned to less established collaborators on research teams, including students (Bartle et al., 2000).
12. Faculty must be careful to balance support for facilitating the academic growth of students with portraying students' abilities in accurate ways (Fine & Kurdek, 1993). Although the literature tends to describe problems when student work is not granted authorship credit, there are also ethical issues when students are inappropriately included as authors. Fine and Kurdek note that a publication on an academic record may falsely represent the student's level of scholarly expertise, the students may be given unearned professional advantages (i.e, evaluations for scholarships, selection for employment based on perceptions of greater competence than student peers), and others may expect future achievement on tasks that are beyond the student's actual level of ability.

These recommendations have emerged through our collective experience in working together in multiple research roles with the NCCYS and in reviewing pertinent professional literature using multidisciplinary sources. In order to respond to many questions pertaining to intellectual ownership in this multidisciplinary research project, we felt that it was important to open the dialogue about practices in student-faculty collaboration that are often unspoken and ambiguous. Participation in large-scale research projects such as the NCCYS requires researchers to be proactive about developing policies and procedures that protect the interests of all members of the research team, including students.

Readers may be interested in how we determined the writing roles and order of authorship for this paper. The lead author organized the writing collaboration, corresponded with the group about general planning and feedback, corresponded individually with contributors regarding their writing, and made a substantial contribution to the content. The topics covered in the paper were negotiated collectively through two draft outlines, and sections were divided to represent a relatively equitable distribution of the workload. Each author volunteered for particular topics, and in some areas of the paper, two authors collaborated for the development of content and subsequent editing. Group correspondence addressed the order of authors. It was decided that alphabetical order, by last

name, would best represent the equitable contributions of authors. This process was important to make sure that decisions and understandings were not assumed; rather, they were negotiated to make sure that all contributors were aware of options and could give input.

CONCLUSION

Collaboration in research and authorship can be an effective strategy for faculty to mentor students and to help them gain valuable experience working with more experienced researchers. With the trend toward multidisciplinary research, students also gain exposure to and experience with a diversity of researcher perspectives. In turn, researchers gain the energy and resources that students bring to research, and it provides faculty with an opportunity to share their expertise with new researchers. Working relationships on a research team can, however, break down owing to different perceptions and ideas about entitlement to authorship and what criteria should be used to determine the order of authorship (Erlen et al., 1997). Researchers need to establish guidelines for assigning credit and a process for all members of the research team to follow. When this is done at the initial stages of a research project, all participants can become informed about the ways that authorship issues are managed. This serves as "an ounce of prevention" to avoid potential conflicts at later stages of research projects when scholarly work such as conference presentations and manuscripts for publication are developed.

Faculty members who supervise students in research roles need to be prepared with strategies to manage effective supervision, and guidelines on how to manage the production of scholarly work that emerges from research. The previous discussion has attempted to shed light on issues of authorship that are frequently not addressed or are, at best, "unspoken rules" in student supervision. Successful collaboration demands that both faculty and students be informed about ethical issues, and openly negotiate roles, tasks, workload, and the assignment of authorship credit.

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Note

1. Due to the nature of theses and dissertations, the problem of supervisors writing for their students to produce intellectual property that is purported to belong solely to the student remains unanswered in this scenario.

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