A guide to writing a DIME Education Grant

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Successful grant writing in health professions education requires a good idea and the ability to communicate that idea in a manner that will interest a reviewer, help them place the study within a particular research context and be clear enough that the he or she can understand how the methodology will answer the research question. Writing a grant that can achieve these requirements requires an understanding of the elements of the grant, the purpose of each section and common errors writers make that end up being noticed by reviewers. The goal of this document is to provide a guide for those who are considering applying for the DIME Education grant, and in the process, provide some tips that will allow them to write a proposal that will increase the likelihood of getting funding.

Elements of a Grant

Introduction or Background

The purpose of the introduction is to describe what you are interested in and why the topic is important. Keep in mind that it is quite likely that a reviewer knows very little about your research area so you need to grab the reviewers' attention and help them understand why your proposal is important.

In order to get the reviewers attention, the first place to start is your opening paragraph. It is important that you start the proposal by providing a context for the reviewer. The context helps the reviewer understand where in the literature your proposal fits. Many proposals do not have this initial step or focus too quickly on either the methodology or on solving a local issue. Starting too focused runs the risk of losing the interest of the reviewer.

Consider the following example:

> *Clinical decision-making in the medical school at the University of Ottawa is not well assessed in the clerkship OSCEs so this weakness needs to be addressed*.

This would be an example of opening sentence of a grant getting too specific too early. It does not provide enough information about the larger context that would help the reviewer understand the importance of the topic and it is not clear what the link is between clinical decision-making skills and the OSCE. If a reviewer is not directly part of the medical school at the University or Ottawa, or has limited knowledge of OSCEs or clinical decision-making skills, they won't appreciate the importance of your project and you risk losing their interest.

Now consider the following example:

> *The assessment of the clinical skills of students and trainees is crucial to ensure proper learning has occurred. The Objective Structured Clinical Examination (OSCE) is arguably the most reliable and valid assessment tool used to measure these skills in our learners. The skills that are typically tested include history-taking, physical examination, management and communication skills. While important, these skills only represent some of the many aspects of what it means to be a good clinician. Other skills like clinical decision-making are seldom tested in an OSCE format but are important skills for successful clinicians to have.*

In this example, the paragraph starts by describing the larger picture of assessing clinical skills and provides enough information that a reader could understand the importance of the topic and the link between OSCEs and clinical decision-making even if they limited knowledge about both topics.

Once the larger context has been set, the next part of the introduction is to provide the background literature that supports your study. Your job as the writer is to take the reviewer from the context in the opening paragraph to your research question. Think of this as a funnel in which you start with a broad topic and narrow it down to the specifics of what you want to do in your proposal. As a suggestion, start by identifying some articles that are relevant to the context but gradually become more specific as you lead to reader to your research gap. A research gap is a weakness in this literature or an unanswered question. Once the gap has been identified, mention your research question and be specific on how it will address the gap.

Common issues that occur in the introduction

a) The introduction focuses on a specific problem too early and therefore does not provide a research context.
b) Statements similar to "*There is no literature on this topic*" should be avoided. All research builds off of other studies; therefore, even if there isn't anything identical to what you want to do, there is a relevant literature that led you to that research gap and research question and it is this literature that should be reviewed for the reader.
    - This type of statement often occurs when the start of the introduction is too narrow.
c) If there are views that differ from yours, acknowledge them, don't pretend they don't exist. If a reviewer does know the literature they will flag the missing perspective.
d) Try to refer to literature that is current but also try to have the important articles listed. If a reviewer does know something about your topic, they will notice if you are missing any key articles.
e) Don't try to do too much in the proposal. Some proposals try to address too many research questions resulting in what are often confusing and/or complicated proposals. While you can acknowledge that there are other potential questions, it is advisable to pick a single issue to address in your proposal.

📖 ***Your task is to help the reader understand what has been done on the topic, what the issue or gap is in this research, and how your study will address this gap.***

Methods

The methods should be organized in a manner that makes for easy reading. Headings should be used to ensure topics are covered in an organized manner and that related topics are grouped together. It is suggested that you use the following headings in this order: design, participants, procedures, analysis.

Design

The design statement provides a short description of what kind of study you will be doing. It should be no more than two or three sentence in length. The purpose of the design statement is to orient the reviewer to the type of study you want to do and to foreshadow the more detailed explanations of methods that will follow. This foreshadowing will help make the later parts easier to read.

The design statement should mention the type of study you will be doing:

a) Randomized control trial, pre/post design, matched cohort study, evaluation, grounded theory analysis, survey, etc.

In a concise manner, it should describe what the experimental intervention will be and who will be part of the study.

a) What will be done, how many groups are used, describe the participants.

Consider the following two examples of well-written design statements that incorporate the suggestions above.

> *A pre/post design will be used. Fourth year medical students attending an elective in cardiology will be asked to interpret a radiograph. Following completion of the elective, all students will be asked to interpret a second radiograph*.
>
> *A qualitative analysis of interview comments will be used. Fourth year medical students attending an elective in cardiology will be trained to interpret radiographs using a case-based methodology. Following the elective, a group of eight volunteers will be recruited to participate in a semi-structured interview designed to collect information about their opinions of the elective*.

📖 ***Your job is to let the reviewer know how the design of your study will answer the research question*.**

Participants

This section should describe who will be participating in your study. If there are inclusion/exclusion criteria, make sure the criteria are listed and that it makes sense given the purpose of the study. You should also discuss how the participants will be recruited and how they will be assigned to any experimental conditions.

The final part of this section should deal with the sample size. You will need a rationale for the number of participants you plan on using, even for qualitative studies. Sample size calculations can be complex and you will likely require some assistance. Some references that might be of help are listed below.

a) For sample size calculations related to comparing groups, correlations, factor analysis, and non-parametric analyses: Norman, G.R., and Streiner, D.L (2014). Biostatistics: The bare essentials (4th ed). Peoples Medical Publishing House - USA: Shelton Connecticut.
b) For sample size requirements related to reliability: Streiner, D.L., and Norman, G.R., (2008). Health measurement scales (4th ed). Oxford University Press: Oxford U.K.
c) For sample sizes related to qualitative studies: Kuzel A. (1999). Sampling in qualitative inquiry. In: Crabtree B, Miller W, eds. Doing Qualitative Research. Thousand Oaks, CA: Sage Publications pp. 33–45.

The following are some tips to consider when describing the sample size section:

a) If your study requires more than one session, or runs over a long period of time, include extra participants to compensate for those who drop out.
b) For surveys, be realistic with regards to the return rate. It is common to get a response rate between 20% and 40%.
c) If you have a limit on the number of people that are available for a study, then say so. In this case it is called a convenience sample.

📖 ***When writing this section, your job is to let the reviewer know that the type of participants you want to recruit will allow you to answer the research question and that you will be testing enough people to make a study worthwhile but not so many people that it will not be feasible to completed in the time allotted.***

Procedures

This section should describe what you plan on doing. It should include:

a) what will be done with the participants
b) what will be measured and how.
    i. If using an existing rating instrument, you may want to provide information on the scale like reliability or any other information related to validity.
    ii. If you have created a new rating or scoring instrument, you should describe how that was done.
    iii. You should also include a copy of the scale in the appendix or refer the reader to published studies.
c) If the study has phases, it may be of value to include a figure that displays the timeline.

📖 ***At the end of this section, you should have added enough detail that anyone else reading this section would be able to replicate your study***.

Analysis

This section should describe how you plan on analyzing your data. It should provide enough detail that it is clear that you have an understanding of what kind of data you will get and what you will do with it. Things to consider include in this section are:

a) Indicate what types of statistical tests you will be conducting to test your hypotheses but be specific. For example, don't use a vague statement like "ANOVA will be used". Mention what the dependent variable will be and what kind of ANOVA will be used.
b) If you have multiple hypotheses about how the data could look, it might help to describe what pattern of results you will be looking for.
c) Describe if and how you will screen for missing data or outliers and how you will treat this kind of data.

Consider the following example.

> *Total scores from the rating instrument will be determined. In addition, demographic data related to age and gender will be collected for each participant. Comparisons to the multiple-choice question component of the exam will be made using correlational and ANOVA techniques.*

The description is not very specific. It doesn't say how total scores will be determined, what will be done with the demographic data and what kind of comparisons will actually be made using the examination scores. The example below is for the same study but clarifies how scores will be used and also the expected pattern of results.

> *Total scores for the six items on the rating instrument will be determined by calculating the mean across the items. A correlation will be used to compare the total score from these items to the total score for the multiple-choice question component of the examination. If the total score from the six items is measuring similar knowledge as the multiple-choice questions, it is expected that the correlation will be high and positive. In addition, demographic data related to age and gender will be collected for each participant. Total scores from the items will be analyzed using a 2x2 factorial ANOVA with gender (male, female) and age (<=25, >25) used as between- subject variables*.

📖 ***Reviewers want to know what analyses you are running and why so your job is to convince them that you have sufficient knowledge of the data that you will be able to use the appropriate test(s) to answer the research question.***

Budgets

A budget should include costs associated with particular tasks but it should also include a justification of those costs. The following should be considered:

a) Check to see if the funding agency has any special requirements. They may or may not fund salaries, or may not cover travel costs. For the DIME Education grant the following items will not be funded:
   i. The purchase of equipment.
   ii. Activities which are an integral part of course planning (e.g. annotated bibliographies, course outlines, student manuals and copying costs)
   iii. Salary or honoraria for investigators.
   iv. Travel, accommodation or meals for external investigators to visit Ottawa
   v. Medical writers
   vi. Preparation of PowerPoint slides for a presentation unless justified

b) Be clear what tasks are being done by investigators in-kind and what tasks are being paid for.

c) Justify each line item: What is the purpose or tasks associated with a line item? A common problem is that expenses are listed without saying what they are or why they are needed.

Consider the following line item for a research assistant:

Item	**Cost**	**Justification**
Research Assistant	$5250.00	$25/hr x 7hr/day x 3 day/week x 10 weeks

In some sense, the cost of the research assistant has been justified but the first question the reviewer will have when reading this line item is "what will the research assistant actually be doing"? The following is an example of providing the detail needed to help a reviewer understand your costs.

Item	**Cost**	**Justification**
Research Assistant	$5250.00	$25/hr x 210 hours of work. Tasks include developing recruitment material, recruiting participants and examiners, organizing video recording, coordinating transcriptions of videos, formatting data for analysis.

The following are some common costs that you should be aware of when creating a budget.

a) DIME Research assistant - $40 / hr.

b) DIME Project coordinator - $45 / hr.
c) Analysis - $75 - $100 / hr.
d) Transcription - $25 / hr. + HST
    i. budget for six hrs. of work for every one hour of interview.
    ii. budget for eight hrs. of work for every one hour of focus group
e) Translation - $0.25 to $.33 / word plus HST
f) Students – it is common to have a draw for prizes. Also, feedback could be provided on a clinical task or make it an educational session in some fashion.
g) Residents -usually around $30 to $50 / hour.[1] You could have a draw for a prize. Also, could provide feedback could be provided on a clinical task or make it an educational session in some fashion. You may have to consider catering if using a group.
h) Faculty – there are no clear guidelines for paying faculty but no more than $150 for a session is suggested.[2] You could also have a draw for a prize. You may also have to include catering.
i) For more information of incentives please refer to http://www.ohri.ca/extranet/clinical_research/sop.asp

j) Dissemination

    i. Travel – DIME caps travel expenses at $1500
    ii. Open Access Journals – These are journals that charge the author(s) to publish in them. For example, BMC Medical Education charges $1945 (USD).

k) Administration fee
    i. These are fees that are charged by an institution to cover indirect costs related to things like heating, electricity, or administrative support. Find out the policy of your institution and check the funding requirements of the granting agency to ensure you can include that in your budget.
    ii. University of Ottawa does not charge any overhead or administrative fees for research grants http://www.rms.uottawa.ca/efaq/grants_faq.asp#Overhead
    iii. OHRI does not charge any administration fee/management fee for holding education grants.

Appendices

Appendices should include mandatory information (e.g., CVs) but could also contain extra information relevant to the grant. The following are items that may be included in a set of appendices

a) CVs of the PI and all co-investigators. Often there is a page limit to the length of the cv so check to see if the CV should be full or partial
b) Include copies of scales or questionnaires that are being used especially if they are not widely known.
c) Previous publications that are relevant especially those that are in press.
d) Letters of support from department head or allied bodies.

[1] Any amount over $50.00 will require the participant to supply a SIN. [2] For faculty, any amount over $150 will require the participant to supply a SIN and any amount over $500 has tax implications.

Abstract

The abstract may be the only part of the grant that some members of the adjudication committee will read. It should include information about the research question and why it is important. It should also have a summary of the methods including participants, design, procedure, and analysis. The structure of an abstract can vary but to keep the abstract focused and easy to read, it is suggested that you use the following headings: problem or background, objective, methods, and significance.

For background:

Start with a sentence about the context, describe the research gap, and then mention the research question.

For methods:

A well-crafted design statement can describe the method of the grant in 2 – 3 sentences.

For significance:

Identify what you hope to find and how it will fill the gap.

The following is an example of a well written abstract that summarizes a study using the suggested structure:

Problem: *Completion of an in-training evaluation report (ITER) is an education task frequently requested of clinical supervisors. Unfortunately, these forms are poorly completed. Given our heavy reliance on this form of evaluation, poorly completed ITERs can lead to the under-reporting of substandard trainee performance. Previous research discovered that a significant part of the problem in failing to report poor clinical performance was that supervisors often did not know what to document when completing an ITER. Clinical supervisors indicate that they want faculty development (FD) programs to help them improve their ability to complete ITERs. However, the effectiveness of faculty development interventions in changing clinical supervisors' behavior has repeatedly been questioned, resulting in a call for more rigorous assessment of program impact.*

Objective: *To evaluate the impact of an FD program designed to improve clinical supervisors' ITER completion in real clinical settings, as measured by a change in report quality when assessed using an objective assessment tool.*

Methods: *An interactive program, developed to improve supervisors' ability to effectively complete ITERs was developed and successfully pilot tested at our medical school. In this study, a pre/post intervention design will be used to evaluate the effectiveness of the program on a national basis. Clinical supervisors at three institutions who regularly supervise residents in a clinical setting will be offered the opportunity to participate in the workshop. A validated tool, the Completed Clinical Evaluation Report Rating (CCERR) will be used to evaluate the quality of the ITERs completed by participants before and after the workshop.*

Significance: *This study will assess the ability of a FD program to influence the behaviour of clinical supervisors when completing ITERs. The national scope of the study will allow for generalizability of the results to other residency training centers.*

 ***Your job in an abstract is to show the reviewers that the problem is important, that your research question is insightful/useful, and that it will be tested in a convincing way.***

Other tips

a) Have someone unfamiliar with the project read your grant proposal.
    i. If parts of the grant are not clear to that person, it will not be clear to a reviewer.
b) Bring in a collaborator to advise or even write parts of the grant for procedures to which you are not familiar.
c) Be neat.
    i. Typos do matter. Also, to help with readability, ensure there is sufficient whitespace on a page. In other words, avoid shrinking the margins and using small fonts with reduced line spacing.
d) Ensure you have formatted the grant to meet grant guidelines
    i. If you are allowed five pages of text, do not submit six pages. The way around a page limit is to use appendices. For example, it is a common strategy to put the budget in an appendix rather than the body of the grant.
e) Ensure you have given yourself enough time to write the grant. It is surprising how often this does not occur and the end result is rushed.

Resources

The following are resources that may be of help when writing a grant.

a) http://www.nsf.gov/pubs/1998/nsf9891/nsf9891.htm
b) http://www.cihr-irsc.gc.ca/e/27491.html
c) Blanco et al. (2015) How to write an educational research grant: AMEE guide no. 101.
d) Bordage, G., Dawson, B. (2003). Experimental study design and grant writing in eight steps and 28 questions. Medical Education; 37:376-385.
e) Devine EB. (2009). The art of obtaining grants. American Journal of Health-System Pharmacology; 66: 580-587
f) Hodgson C (1989) Tips on writing successful grant proposals. Nurse Practioner, 14 (2), 44-54
g) Streiner DL (1996). While you're up, get me a grant: a guide to grant writing. Canadian Journal of Psychiatry; 41:137-43.