

DEVELOPMENT OF ENDURING EDUCATIONAL MATERIALS

QUALITY

Rationale/Goals 5 pts

- Statement of the overall theme underlying these enduring materials?
- Rationale for dedicating part of career to creating these enduring materials.
- What has the faculty member gained by having created these materials?
- What value does the faculty member expect others to gain by using the materials?

Adequate Preparation and Self-Reflection 10 pts

- Structured abstracts are included for each distinct type of enduring material.
- Statement included regarding changes that have been made in enduring materials with experience and the rationale for each change.
- Evidence that product developer has solicited and used advice from experts in the field, colleagues and mentors.

Appropriate Methods and Materials 15 pts

- Enduring products were designed with a clear and well documented educational need in mind.
- Enduring products were designed with a clear set of learning outcomes directing development. (Outcomes specifying what the student will be able to do as a result of using the product in the intended way.)
- Enduring products were designed in accordance with current principles of learning and instruction.
- Enduring products encourage active learning.
- Enduring products encourage application of knowledge and skills.

Evidence of Product Effectiveness 35 pts

- Documented changes in knowledge and/or skills.
- Documented changes in attitudes and/or perceptions.
- Documented changes in behavior (evidence of changes in practice behavior).
- Documented evidence of learner satisfaction with the product
- Documented evidence of product adoption by other teachers, learners and institutions
- Positive published review of product by expert in field

QUANTITY/BREADTH 35 pts

- Scope and size of each product (number of pages, number of contact hours).
- Number of distinct products developed.
- Number of teachers who have used each product.
- Number of institutions that have used each product.
- Evidence of continued use (use over multiple years – a measure of enduring quality).

Application for the Academy for Scholarship in Education

Development of Enduring Educational Materials

Structured Summary

Please provide a summary of the materials to be found in your application. See Example application for guidance.

Faculty Profile:

Personal Statement	
Personal Goals	
Personal Preparation	
Personal Reflection/ Process for Improvement	

Descriptions of Quantity		Evidence of Quality
Discussion of Breadth		

Personal Statement:

Appendices:

Please attach supporting documents, including letters of support, appreciation, awards, positive evaluations etc. Please do not attach lesson plans or presentations.

EXAMPLE

Development of Enduring Educational Materials

Structured Summary (serves as a Table of Contents for the Personal Statement and Structured Abstracts)

Faculty Profile: PhD in Clinical Department

Key Points from Personal Statement: (with evidence of quality related to goals, personal preparation, and ongoing development/self reflection)

- Creation of enduring materials that promote independent, clinically-relevant learning
 - Integration across many fields including cognitive neuroscience, educational psychology, and information design
 - Critiques from learners at all levels as well as peers in order to refine materials and develop new approaches
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List of Structured Abstracts included in Mini-Portfolio

1. **Short Review Articles - Insights to the Brain*** – 12 mini-reviews designed to inform neuroscientists about advances in brain research.
2. **Short Review Articles - Anatomy Imagery*** -- short reviews of specific areas of clinical anatomy for radiologists.
3. **Large Format Charts** – 20 large (14 X 17), laminated charts (complex displays of biomedical information)
4. **Elementary Education Resource Kits -- BrainConnection*** – Four units of linked curriculum materials designed to teach elementary and middle school students about the brain and nervous system.

* Titles are pseudo-names

Discussion of Breadth

I have created a wide variety of materials for diverse audiences of learners. The format of these materials ranges from review articles designed to inform neuroscientists about advances in brain research, to large format charts used by practicing radiologists and for teaching and reference in medical education, to curriculum materials used in elementary and middle school classrooms. Topics have included radiology, neurology, psychiatry, neuroscience, physiology, and anatomy. These materials have been widely used nationally and internationally.

Explanation about Documentation of Items in Structured Summary

Descriptions of Quantity: For each type of enduring material that is listed in the Structured Summary, include a Structured Abstract describing information such as the format, scope or size, methods, learner population, your role in the creation of the material, and usage statistics. When possible, include documentation of these items in an appendix, (e.g. copy of title page).

Evidence of Quality: Documentation of evidence of quality is not provided for in this example. Nevertheless, you should include in your mini-portfolio as much documentation as possible of the evidence you cite in your Structured Abstracts. For example, if you refer to ratings of peers and/ or learners, you should include copies of the forms or letters you received giving you those assessments. Be sure to make clear reference to the documentation on your Structured Abstract by number or name (e.g., "See Appendix A"). The documentation you provide will enable the Review Panel to "audit" the quality information on your Structured Abstract pages.

Personal Statement (makes reference to your goals in the creation of enduring educational materials, your preparation or background that is relevant to the category, and ongoing efforts to evaluate and improve materials.)

My interest in creating enduring educational materials initially arose from my realization of how few really good teachers there are. There are not, and never will be, enough good teachers to go around. Thus, I can make a valuable contribution by creating materials that both make learning easier and promote independent learning. My audience for my projects has ranged from elementary school students ([BrainConnection](#)) to undergraduate and postgraduate medical students to practicing radiologists and neuroscientists (review articles and charts). Topics areas have included radiology, neurology, psychiatry, neuroscience, physiology, and anatomy (see Appendix for a full listing in each category).

I believe strongly that we have a responsibility as teachers to facilitate the learning process in any way we can. Thus information should be presented in a manner that promotes understanding and helps the learner create the structure and interconnections required to transform bits of information into useful and useable knowledge. I am convinced that it is possible to do a much better job than has been done traditionally in designing and creating educational materials.

Most teaching and reference materials are still based upon the oldest of the print technologies - black print on a white page with at most occasional use of color to lighten up the prose. Related information is spread across many pages (or sometimes many books), making it difficult to draw all the pieces together mentally. Most materials are

presented in a way that would be quite familiar to a person from 50 or 100 years ago. However, text is often not the best way to present complex information. Our vision is in many ways our strongest sense, and we can process and understand a huge amount of information at a glance if it is presented correctly.

I have drawn on many fields in creating my approach to teaching material design, including cognitive neuroscience, educational psychology and the new field of information design. Information is drawn from all relevant sources and integrated together in order to maximize understanding while minimizing the cognitive load for the learner. I use both color and graphics very heavily because they allow a much higher density of information presentation than text alone. Careful use of color can also decrease the time needed to evaluate new information as well as increasing the accuracy of the assessment. Along the way I have learned a great deal about both creation of computer graphics and the process of printing, as I have found that it is easier for an anatomist to learn how to create graphics than for a graphic artist to learn anatomy.

Structured Abstract: (Descriptive information about items listed in the Structured Summary including references to documentation of descriptions of quality in an Appendix)

Short Review Articles

Title: **Insights to the Brain** is a series of short review articles that appear in every quarterly issue of the Journal of Clinical Neurosciences (pseudo-name). [See Appendix A for a copy of the initial page of each article.]

Content: To date, topics have included application of new imaging and other investigative techniques to better understanding Huntington's disease, normal pressure hydrocephalus, autism, alcohol dependence, Binswanger's disease and schizophrenia. Other papers in the series have provided overviews of topics ranging from history and present state of surgical treatment of mental illness to the effects of estrogen in the brain.

Audience: The topics and writing level are specifically chosen with residents and practicing clinicians in mind. These papers are also useful in teaching situations with other groups, such as medical and graduate students.

Size: Each 'mini-review' is 4-6 pages in length. They are published quarterly, with a total of 12 since we initiated the series in 2001.

Role: My role in this project is to provide the neurobiological perspective required to synthesize the information and prepare simplified accounts of research techniques and findings for this audience. I participate in the topic and illustration choice to assure that the series covers a wide range of appropriate subjects.

Methods: In collaboration with one other person I perform the appropriate literature search, extraction and synthesis of key information, and writing of each article. Illustrative images are solicited from experts in the particular research area from which I create the figures to go with the text as well as the cover art for the journal.

Peer Review: Experts also review the article to assure absolute accuracy. This is critical to the process because it is necessary to greatly simplify technical descriptions for the target audience. By including experts as co-authors I assure the high quality of the information provided in the series is maintained.

Usage: The citation impact of this journal is 2.14. [See Appendix B]

Ratings: According to the Journal staff, this series generates many favorable comments and many viewings on their WEB site. I have received multiple requests for reprints and/or slides to be used in teaching from my colleagues at large. [See Appendix C for a summary of comments]

Structured Abstract: (Descriptive information about items listed in the Structured Summary including references to documentation of descriptions of quality in an Appendix]

Short Review Articles

Title: **Anatomy Imaging**

Format: This is a series of short, review articles that appear in every bimonthly issue of the Journal of Technology-Based Medical Imaging (pseudo-name). [See Appendix A for a copy of the initial page of each article.]

Goals/Purpose: The purpose of the series is to teach about aspects of anatomy that have been made clinically-relevant by the advent of better diagnostic imaging techniques.

Content: To date topics have included details of the venous drainage of the Sylvian fissure, nomenclature and imaging anatomy of the spinal ligaments, sectional anatomy of the upper and lower limbs, reconciliation of the three systems of classification (anatomic, radiologic, surgical) for the mediastinum, and imaging anatomy of the pelvic ring ligaments.

Audience: The topics and writing level are specifically chosen with residents and practicing clinicians in mind. These papers are also useful in teaching situations with other groups, such as medical and graduate students.

Size: Each article is 3-5 pages in length. They are published 6 times a year, with a total of 11 since we initiated the series in 2002.

Role: My role in this project is to provide the anatomic, information design, and computer graphics expertise required to synthesize the topic body of information into a highly compressed graphic format.

Methods: In collaboration with one or two other people I participate in the appropriate literature search, extraction and synthesis of key information, design and creation of two full page illustrations, and writing of each article.

Peer Review: Content experts collaborate in the preparation of each article and solicit review from clinicians working in the area to assure accuracy. In many cases the work is presented at one or more national meetings prior to preparation of the article. This allows critique to be sought from a very wide range of knowledgeable individuals.

Usage: The citation impact of this journal is 1.484. [See Appendix B]

Ratings: This series generates many favorable comments and many viewings on their WEB site. I have received multiple requests for reprints and/or slides to be used in teaching from my colleagues. [See Appendix C for comments from colleagues]

Structured Abstract: (Descriptive information about items listed in the Structured Summary including references to documentation of descriptions of quality in an Appendix)

Title: Large Format Charts for Teaching & Reference

Type of Material: Large format (14 x 17) heavily graphic color charts that summarize and synthesize related information from anatomy, clinical medicine and radiology.

Goals/Purpose: The purpose of these charts is to use information design to speed access to information and broaden the relevant information that will be easily found. This carefully designed approach also helps the learner create the structure and interconnections required to transform bits of information into useful and useable knowledge. They are specifically designed so that they can provide either a quick overview or a detailed view of a topic.

Content: To date topics have included sectional and compartmental anatomy and pathology of the head/neck and larynx, sectional and nervous anatomy of the upper limb, sectional and nervous anatomy of the lower limb, vascular anatomy of the head and brain, functional anatomy of the cortex, subcortex, brainstem, and spinal cord, and bony anatomy of the pelvis, skull, temporal bone, and sinuses.

Audience: The charts are created to meet the immediate reference/teaching needs of residents and practicing clinicians. They are posted in educational settings and used to enhance clinical teaching. They are also useful in teaching situations with other groups, such as medical and graduate students.

Size: The number of charts in a set has varied from 1 to 6. Since 1997 I have been involved in creating 20 of these charts.

My Role: My role in this project is to provide the expertise in information design, computer graphics, and anatomy and to assure that all information is presented accurately and completely.

Methods: All charts are created in collaboration with content experts in the relevant medical disciplines to assure accuracy and completeness. Once all information is gathered that is agreed to be central to the topic, I create the required illustrations and design the chart(s) so as to present the information in an optimal manner.

Peer Review: All charts are presented as teaching exhibits at the national meetings of all the involved medical specialties to invite review and critique during their evolution. Prior to publication they are routinely reviewed by outside experts. [See positive comments in Appendix D]

Usage Statistics: The charts have been well received by practicing clinicians and teachers, as evidenced by steady sales in the absence of any marketing. Over the past 6-7 years 2,000-3,000 charts have been purchased annually as a result of exposure at meetings and word of mouth. The charts are being used both nationally and internationally.

Ratings of Peers: Many charts have won awards when presented as exhibits at national meetings. An additional indication of high regard is the increasing flow of requests for charts covering specific topics. [See a description of the awards in Appendix E]

Structured Abstract: (Descriptive information about items listed in the Structured Summary including references to documentation of descriptions of quality in an Appendix)

Elementary Education Resource Kits

Title/Citation: BrainConnection. University Publishers: New York, NY.

Type of Material: The units are sets of interrelated curriculum materials designed to promote inquiry-based learning in classroom, home, or informal educational settings. They include a teacher's guide to help instructors understand how to present the material for different levels of learners. They also include a guide for hands-on, interactive student activities in various educational settings.

Goals/Purpose: The purpose of these units is to teach about the brain and nervous system.

Content: The units cover the areas of comparative brain anatomy, motor systems, sensory systems, and learning and memory.

Audience: The units were created to be appropriate for teaching elementary and middle school students. They have also been used as a source of activities and a guide to appropriate level of presentation by neuroscientists doing school presentations.

Size: Four units have been created. Each BrainConnection unit consists of a mini-magazine (*Explorations in Neuroscience*), a teacher's guide to activities (*Activities in Neuroscience*), an adventure story (*Adventures in Neuroscience*) and a language arts supplement (*Reading Link*).

My Role: My role in this project was to create the scientific content, collaborate on creating appropriate extension and hands-on activities, and assure that all segments presented consistent, accurate neuroscience.

Methods: I initially write a few paragraphs presenting the core information for the topic area. This is rewritten in collaboration with a team that includes other experts including a teacher and a writer/editor. As a group we create the activities and teacher's guide as well as guide the development of the adventure story.

Peer Review: All units were extensively field tested in Houston-area classrooms prior to national dissemination.

Usage Statistics: Workshops are now taught at 4 regional centers as well as at national meetings. More than 6,000 teachers have participated, and evaluations have been overwhelmingly positive. In addition, more than 200 scientists have used the materials in educational settings. [See documentation in Appendix F]

Ratings of Peers: Both teachers and students have rated the BrainConnection materials very highly during field testing. The Office of Science Education, NIH, selected the BrainConnection project as "one of the 3 or 4 agency-sponsored programs aimed at K-16 education that works". [See teacher ratings and comments in Appendix G]