Excerpt from: "A Framework for Planning Education and Public Outreach Programs Associated with Scientific Research Programs "

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The Figure offers a conceptual framework to support the planning of education and public outreach (EPO) programs associated with scientific research programs. The framework is based on actual EPO planning, both for a scientific research institution and for a large NASA flight project. It distinguishes among realms labeled Formal Science Education, Informal Science Education, Public Outreach, Marketing, and News Media Support (NMS) in terms of the products they produce, where audiences are typically reached, and the intended effect on those audiences. In principle, these realms are all part of a single continuum of activity that may be called "Science Communications" whose larger purpose is to increase science attentiveness, appreciation, and understanding. In practice, however, new initiatives at NASA and NSF support greater scientist involvement in EPO, *as distinct from Marketing or NMS*. Of course, scientists' contributions can be valuable in any realm depending on their talents and interests.

The framework depicted in the Figure is largely self-explanatory, with each realm of science communication being represented by a geometric region that overlaps or interacts with other regions. Each region is labeled with a letter that refers to an associated text box listing *representative* products or activities. The complete paper (available by request from camorrow@colorado.edu) offers references to specific examples of programs, products, and potential partners for each of the regions. Naturally there is a rationale for why a product or activity is listed in a particular region, but for purposes of this framework, it is most important to consider whether it falls in the realm of EPO as opposed to the realms of Marketing or NMS. It is also important not to confuse the message with the medium. Print materials, websites, videos, and CD-ROMs are all media whose content may be designed for use in any of the science communications realms; media choices depend on the access the intended audience has. Note that programs for women and minorities are not in a separate region but pervade all communications realms.

While the framework provides ideas and terms of reference in support of actual EPO planning, it is not meant to represent a particular institution's organizational approach to science communications. The framework makes no claim to being *unique or universal*, but hopes to earn the claim of being *useful*, both in helping to identify and organize suitable elements of EPO plans associated with scientific research programs, and in helping to develop mutually beneficial connections with Marketing and NMS activities. Such connections stimulate thinking toward a comprehensive science communications plan that includes all of the realms. Audiences have different entry points into the framework, most of them via the news media at the far right. Wherever they enter, the challenge is to lead them as far leftward as possible.

Contrasting Formal Education and Public Outreach*: *Regions A and E

In simple terms, "Formal Education" (region A) directly involves or affects student and teacher learning in the formal education system. Formal education is typically classroom-based, but it can also be home-based via the web, TV, or the post. Teacher workshops are often offered in unique environments such as museums. At its best, formal education addresses multiple intelligences and education standards. It provides a long-term opportunity to acquire basic literacy and deepen understanding of fundamental concepts that are useful in contributing to and interpreting the world. By contrast, "Public Outreach" efforts (like educational radio, TV, or periodicals – Region E) are outside the classroom and reach a wider public in their homes or cars where they may conveniently tune in. In this framework, Public Outreach means the provider has *reached out* to where people normally are; a person need not move from their everyday path in order to access it. Compared to formal education, individual public outreach events are generally shorter-term opportunities for providing larger audiences with relatively new information that excites interest and arouses curiosity. Such events are often entertaining, although they tend to retain a more substantive educational value compared to "Marketing" or "News Media" events (see below). In general, there is a trade-off between numbers of people reached and the impact on science understanding.

The Glue-like Nature of Informal Education*: *Regions B-D

"Informal Education" may be thought of as glue between the realms of Formal Education and Public Outreach, providing strong linkages to both. Products and activities in the informal education realm tend to combine the educational substance of formal education with the excitement and relevance of successful public outreach. Unlike Public Outreach (as defined here), Informal Education typically requires a person to travel to unique settings that are outside both the classroom and the home (e.g. nature centers, museums, aquariums, zoos, national or state parks, club meetings, career fairs, eclipse locales). These are often ideal environments for family-based learning. Informal learning opportunities are active and voluntary and are intended to provide motivation for further formal learning and life-long interest.

Region B of the Informal Education circle, which overlaps with Formal Education, tends to involve more structured achievement, but without the assessments of formal classroom education. The NSF refers to this realm as "Non-Formal Education". Region D of the Informal Education circle (overlapping Public Outreach), tends to offer a more passive entertainment mode, but in a special environment like an IMAX theatre, or planetarium rather than at home with the television. The NSF Informal Science Education program provides tens of millions per year to support many of the items listed in Regions B-E.

Marketing and News Media Support*: *Regions F and G

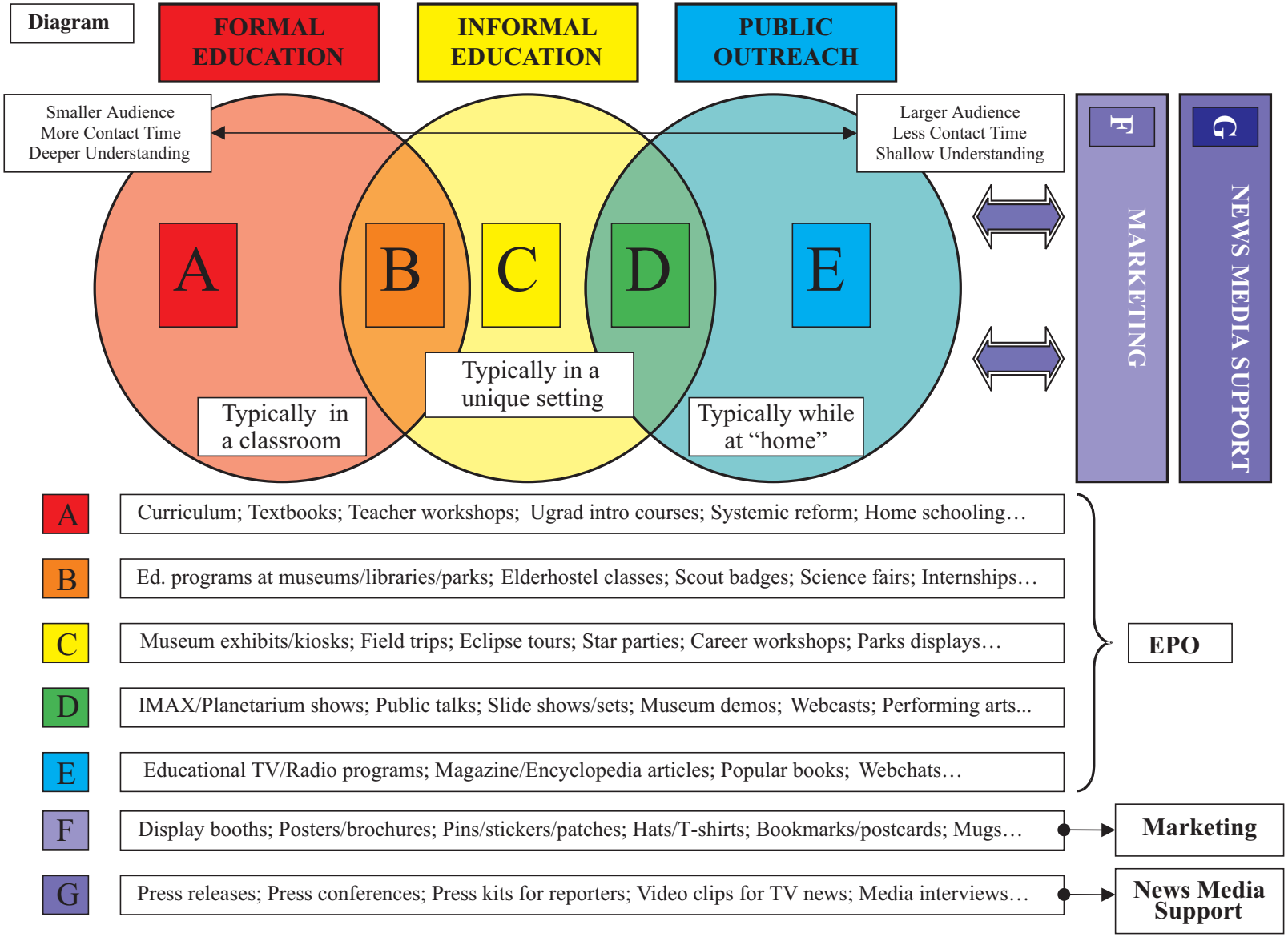
Marketing products and activities (such as brochures, posters, and conference displays or booths) are generally developed on time scales of weeks or months and are intended to market the worth of programs and products to targeted customers or special interest groups (such as teachers, aerospace or other industry, politicians, retired people, physicians, and so on). Here it is important to avoid construing displays at teacher conferences as an element of Formal Education. Of course such displays can be valued by teachers as sources of information and resources in support of their formal education efforts, but they are not in themselves formal education. The educational value of a display or booth can be enhanced with educational demonstrations, mini hands-on workshops, or "Ask-A-Scientist" opportunities. Souvenirs and "give-aways", such as stickers, coffee mugs, lapel pins, patches, T-shirts, mouse pads, and toys comprise another genre of Marketing product that provides good will, but is usually of limited educational value compared to EPO products. Marketing products can be prizes or rewards for those attending EPO events.

NMS deals primarily with providing new information for the print, radio, and television media via reporters. NMS products are often developed on a deadline with a time scale of hours or days (as contrasted with the months or years associated with EPO products like curricular materials, a museum exhibit, or a public TV program). NMS efforts are intended to inform reporters about the latest newsworthy events. The news media reach the largest audiences, and content can sometimes be adapted for more substantive educational purposes. More often, however, news coverage tends to capture short-term attention without offering deeper understanding. Good science news reporting can include URLs for EPO websites that allow those interested to follow up with the next levels of understanding.

There are several ways for Marketing and NMS activities to play well together with EPO:

1. Increase the educational value of selected Marketing and NMS products
2. Use Marketing and NMS products to raise awareness of and increase access to EPO activities and products (essential to getting EPO products used, EPO events attended, and EPO efforts appreciated)
3. Take advantage of the attention-getting quality of Marketing and NMS events to conduct EPO activities or distribute EPO products
4. Adapt EPO products/activities as background and science training for science writers and reporters.

The complete paper (available by request from camorrow@colorado.edu) offers additional specific examples for each of the methods listed above. It also gives proper acknowledgement to the many colleagues in science and science communications who have influenced the ideas presented here.



This 3-circle Venn diagram offers a conceptual framework for planning education and public outreach programs associated with scientific research programs.

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