LRP2010 WHITE PAPER ON EDUCATION AND PUBLIC OUTREACH: ENGAGING CANADIANS FROM MAIN STREET TO PARLIAMENT HILL

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LRP2010 Whitepaper on Education and Public Outreach

ABSTRACT

Astronomy has broad appeal to the general public and our community bears a responsibility to share the results of our publicaly funded research with Canadians. While there have been many sucesses in the past decade in Education and Public Outreach (EPO), including the International Year of Astronomy(IYA), most EPO recommendations in the LRP2000 were not implemented. In this paper we review the past decade of EPO and lay out goals and specific recommendations for the next decade.

Subject headings:

1. INTRODUCTION

Astronomy appeals to Canadians of all ages. It is an exciting frontier science and plays an important role in almost every culture. Astronomy also functions as a gateway science, drawing in children and young adults to science and technology.

While professional astronomers play a key and unique role in astronomy EPO in Canada, their role is a minor one. A vast network of amateur astronomy groups, planetaria and science centers provide the majority of astronomy *experiences* to the Canadian public, who can also access the multitude of websites and other electronic resources from around the world.

The challenge for the broad Canadian astronomy community is to build a strong EPO program over the next ten years that communicates the successes of **Canadian** astronomy to ensure that the public and their elected representatives are aware of our impact and our role in developing new knowledge and a highly qualified workforce. This can only be done by increasing the resources available for EPO and building upon the partnership between professional and amateur astronomers, and astronomy educators that was developed during IYA2009.

2. MOTIVATION FOR EPO

The Preamble from the Washington Charter[1] states:

As our world grows ever more complex and the pace of scientific discovery and technological change quickens, the global community of professional astronomers needs to communicate more effectively with the public. Astronomy enriches our culture, nourishes a scientific outlook in society, and addresses important questions about humanity's place in the universe. It contributes to areas of immediate practicality, including industry, medicine, and security, and it introduces young people to quantitative reasoning and attracts them to scientific and technical careers. Sharing what we learn about the universe is an investment in our fellow citizens, our institutions, and our future. Individuals and organizations that conduct astronomical research - especially those receiving public funding for this research - have a responsibility to communicate their results and efforts with the public for the benefit of all.

Surveys show that Canadians' interest in astronomy is high, but they do not feel well-informed about current developments and issues. In particular, Canadians are generally quite unaware of the activities and achievements of the Canadian astronomical community. Astronomers in Canada have an obligation to communicate the nature, importance and successes of their work to the public who fund most astronomical research.

Canadian astronomy must do a much better job of *marketing* itself to the general public and decision makers. As funds for scientific research become more difficult to obtain[2], we need to make the case for our share. Moreover, youth interest in astronomy is under pressure from other areas such as climate change (see Table 1).

3. EPO ACTIVITIES SINCE LRP2000: HIGHLIGHTS, SUCCESSES AND CHALLENGES

3.1. *State of EPO in Canada - Current Activities*

CASCA-directed EPO in Canada is mostly an ad hoc set of activities supported by *volunteer* effort. Two significant exceptions are the CASCA Astronomy Education website and the CASCA-WESTAR lecture series.

An extremely successful IYA2009 has just been completed (see report at http://www.astronomy2009.ca). We believe that there are lessons to learn from the success of IYA that can be applied to future EPO in Canada. Four keys to IYA Canada's success were identified:

- An effective partnership between professional and amateur astronomers

[1] Gemini Observatory
[2] Thompson Rivers University
[3] University of Western Ontario
[4] Athabasca University
[5] Université de Montréal
[6] Planétarium de Montréal
[7] University of British Columbia
[8] University of Saskatchewan
[9] St. Mary's University
[10] CASCA
[11] California Institute of Technology
[12] NRC-HIA

[1] See http://communicatingastronomy.org (Endorsed by CASCA Board)

[2] The NSF FY2011 budget request is for an overall increase of 8% while the Astronomical Sciences Division increase is only 2.5%

- A bilingual website captured event and attendance statistics essential for evaluation
- Funds were raised to hire a part-time program manager
- Broad participation occured in both large cities and smaller population centers (see Figure 1)

The importance of the partnership, developed over three years, with the amateur groups, cannot be overestimated. Their enthusiam, variety of skills and geographical distribution were essential in making IYA2009 a remarkable EPO success.

3.2. *Successes of the Past Decade*

CASCA Astronomy Education Website

- Initial grants from PromoScience and the Ontario Youth Science & Technology Awareness Program established a website, developed by a professional web designer, which was launched in 2003
- One day/week education coordinator (maintains and adds content to website) hired
- Since July 2009 there have been 29,595 visitors to the website, with the target market of teachers reached. The two largest referring sites are CASCA and the RASC, and the top three accessed pages are the telescope buying guide, Canadian space technology, and careers in astronomy

Strong partnership with amateur astronomers

- CASCA EPO helped initiate contacts that led to partnership between CASCA, FAAQ and RASC to plan and implement IYA 2009 in Canada
- EPO Chair secured Trottier Family Foundation funding to hire a program manager for IYA2009
- Members of the RASC and FAAQ have attended, and assisted with, the education sessions and teachers' workshops at CASCA annual meetings
- CASCA EPO, RASC and FAAQ members contributed to the >1.9 million Galileo Moments recorded on the IYA2009 Canada website
- CASCA administers on behalf of the IYA partnership the PromoScience grant for IYA Legacy for 2009-2011; a part-time EPO-IYA coordinator was hired in mid 2009
- CASCA EPO has provided advice and some funding for the development of RASC's "SkyWays", a guide to astronomy teaching in the schools

Planetaria, science centers and related

- NRC-HIA established The Centre of the Universe, which has established an increasingly visible *national* presence through programs such as Marsville and participation in National S & T Week planning
- Regular reports and articles on planetarium activities appear in CASCA's newsletter
- The new Dunlap Institute hired a *Journalist in Residence* and the Perimeter Institute organized a 2009 EPO extravaganza with strong astronomy content reaching an estimated global audience of one million

3.3. *Challenges Not Met*

AstronomyCanada.ca website

- Conceived in 2005-06 to fulfill the LRP2000 goal to "create a first rank national web site for astronomy" with the aim of providing high quality images and information showcasing Canadian astronomy (see mockup from 2005 in Figure 2)
- A PromoScience application for website development submitted in 2005 was unsuccessful

Relatively few CASCA-WESTAR lectureships
An average of only one CASCA-WESTAR lectureship per year was funded even though the WESTAR money could fund many more

Fundraising within CASCA
Only $15,000 of $30,000 goal for IYA EPO activities contributed by CASCA members

Funding EPO as part of new projects No practical way was identified to implement the recommendation that approximately 1.5% of any project budget be allocated towards the support of related outreach efforts.

4. LOOKING FORWARD: EPO IN THE NEXT TEN YEARS

One overarching theme for the next ten years will be for our community to make effective use of new media and emerging technologies to communicate directly with target audiences. This will be especially important for reaching the youth of Canada. Examples of new media include blogs, Facebook, and Twitter.

4.1. *EPO Goals for Next Decade*

1. The CASCA-WESTAR series of lectures introduced in 2002 have had limited success. Since 2002 there has been approximately one CASCA-WESTAR lectureship per year. We believe restyling the lectures along the lines of the successful IYA Galileo lectures and advertising them as *Beyond IYA* opportunities using channels developed with amateur groups will increase the number of lectures given. Other avenues, such as the RASC Journal, of advertising the lectures need to be explored as well.
2. While classic websites are still a mainstay of providing information, a large number of new technologies in the area of social media have revolutionized communication. Blogs, micro-blogs such as Twitter, social networking sites like Facebook, multimedia sites like Flickr and YouTube, are important channels for communicating with the public, especially for those under 30. For example,the CASCA EPO coordinator (see below) would be reponsible for managing Facebook and Twitter accounts that will be used to systematically anounce news, events, etc.

3. Build upon the greatly strengthened partnership between professional and amateur astronomers that emerged from IYA to ensure that the broad astronomy community in Canada maximizes our impact. Our community needs to maintain closer working relationships and develop mutually beneficial joint initiatives with amateur astronomy groups.

4. Develop mechanisms to engage remote communities in astronomy. Canadian astronomers are mostly located in large cities and visiting a significant number of smaller remote towns and villages is not practical. However, the majority of remote population centers do have Internet. We need to develop innovative ways to use Internet technologies to communicate with this important audience. One possibility is to establish an "ask an astronomer" service for remote communities where an astronomer uses technology such as Skype to communicate with the individual asking the question. The Virtual Researcher on Call program (http://www.vroc.ca) is an excellent example of this virtual outreach.

5. The CASCA Education website should be expanded and developed further, specifically in promoting the use of web technologies in education. Finding reliable information online can be problematic and the ability to go to a central repository of good material would be very helpful to astronomy educators.

6. Develop the bilingual AstronomyCanada.ca website so that all Canadians have access to inspiring and informative textual and visual material about Canadian astronomy. AstronomyCanada.ca will serve as a central resource for communicating the achievements, activities and aspirations of Canadian astronomy to the public, Canadian media and decision makers. The regularly updated site will include clear and informative text, striking images and graphics from Canadian astronomical research groups. This authoritative content will be produced by communication specialists working closely with Canadian astronomers. Our partners will include Canadian professional and amateur astronomers and their organizations, industry, government agencies, and the formal and informal education communities. The site will provide links to education and outreach programs; amateur astronomy, university, government, facility and project websites and to current news items about Canadian astronomy. See http://www.astronomynovascotia.ca/ (Figure 3) for an example of this approach.

4.2. *EPO Recommendations for LRP2010*

1. **Incorporate EPO in Research Funding** - NSERC, and other granting agencies, should foster a cultural change in our community by requiring an explicit, viable and compelling outreach component in both the Plan and Budget section of each research proposal. This would be over and above the science budget. This is similar to the broader impacts review criteria for NSF proposals. [3] This would lead to having more researchers, and their students and PDFs, directly involved in public engagement. Currently, most professional reward systems of tenure and promotion do not sufficiently encourage research scientist engagement in EPO.

2. **EPO Funding Included in New Projects** - Each new project should include a specific budget line for public engagement associated with that project. The LRP2000 recommended 1.5% of the budget and this should be considered a minimum. One possible mechanism to achieve this is for funding agencies to coordinate on major projects to ensure that EPO is properly supported. For example, NRC could fund the capital to be managed by HIA and NSERC could fund the public engangement component by a grant to the Project Scientist based in a university.

3. **Funding for Education and Public Outreach** - Our community needs to identify a mechanism by which core EPO in Canada can be funded sustainably. Resources are needed for a full-time CASCA EPO office which could be hosted by a Canadian institution. The EPO office would consist of at least one person who, along with contracted support and volunteer effort, would develop and maintain the AstronomyCanada.ca website, develop and maintain public engagement through social media, manage the CASCA-WESTAR lecture series, and work on other national EPO projects[4].

4. **CASCA Award for Communication** - CASCA should establish an award, possible using the WESTAR funds, recognizing outstanding achievements in astronomy communication in Canada.

5. CONCLUSIONS

The next decade of EPO in Canada must build upon the fruitful and respectful partnership established between professional and amateur groups. We recommend incorporating EPO funding directly into both project and research grants, and creating an EPO office under CASCA oversight to ensure that research results are shared in the most appropriate manner. We must be utilizing the rapidly evolving mass communication technologies to reach our audiences, especially underserved audiences such as inner-city youth, Aboriginals and young woman.

[3] The proposal must describe as an integral part of the narrative, the broader impacts resulting from the proposed activities, addressing one or more of the following as appropriate for the project: how the project will integrate research and education by advancing discovery and understanding while at the same time promoting teaching, training, and learning; ways in which the proposed activity will broaden the participation of under-represented groups (e.g., gender, ethnicity, disability, geographic, etc.); how the project will enhance the infrastructure for research and/or education, such as facilities, instrumentation, networks, and partnerships; how the results of the project will be disseminated broadly to enhance scientific and technological understanding; and potential benefits of the proposed activity to society at large.

[4] A range of skills is needed (graphics, writing, web) which indicates more than one person

Subject	Very Interested	Moderately Interested	Not at all Interested
New inventions and technologies	42	45	13
Earth and the environment	41	48	11
The human body, medical discoveries	38	44	18
Information and communications technologies	37	46	16
The universe, sky and stars	22	42	36

TABLE 1
Results of a 2008 European survey of youth 15-25 showing the percent interested in different science and technology subjects.(Young People and Science - Analytical report: http://ec.europa.eu/public_opinion/flash/fl_239_en.pdf)

LRP2000 Recommendation	Result
"**The LRPP strongly recommends** that approximately 1.5% of any project budget be allocated towards the support of related outreach efforts. This should be one of the highest priorities among the outreach initiatives. Furthermore, the NRC and the CSA should create modern visitor centers that would further aid in the education and enjoyment of the public and the media"	No mechanism was identified to allocate funds associated with capital projects specifically for related outreach efforts. NRC did establish the Centre of the Universe visitor centre in Victoria
"**The LRPP strongly recommends** that the Canadian Astronomical Society (CASCA) and the NRC with the participation of the CSA, create a first rank national web site for astronomy. This should be one of the highest priorities among the outreach initiatives"	Efforts to obtain funding through an NSERC grant were unsuccessful and the website was never developed
"**The LRPP recommends** that CASCA play a steering role in the area of educational outreach to schools. It should allocate resources towards providing workshops and tools for teachers, maintaining a related web site, and employing an information officer who could co-ordinate these activities. It is critically important to develop comprehensive public outreach programs of different kinds. A concerted and sustained effort must be made to establish a multi-tiered outreach program that encompasses the public, educational institutions, amateur groups, the government, and the media"	The CASCA Education website was developed which has been successful as indicated by the available feedback and metrics

TABLE 2
LRP2000 recommendations on Education and Public Outreach and results over the past 10 years

FIG. 1.— A map showing the number of IYA2009 "Galileo moments" across Canada

FIG. 2.— A mockup of a possible AstronomyCanada.ca homepage from 2005. Note that this is not the way the website would look if designed by a professional web developer in 2010 - Figure 2 shows the AstronomyNovaScotia website.

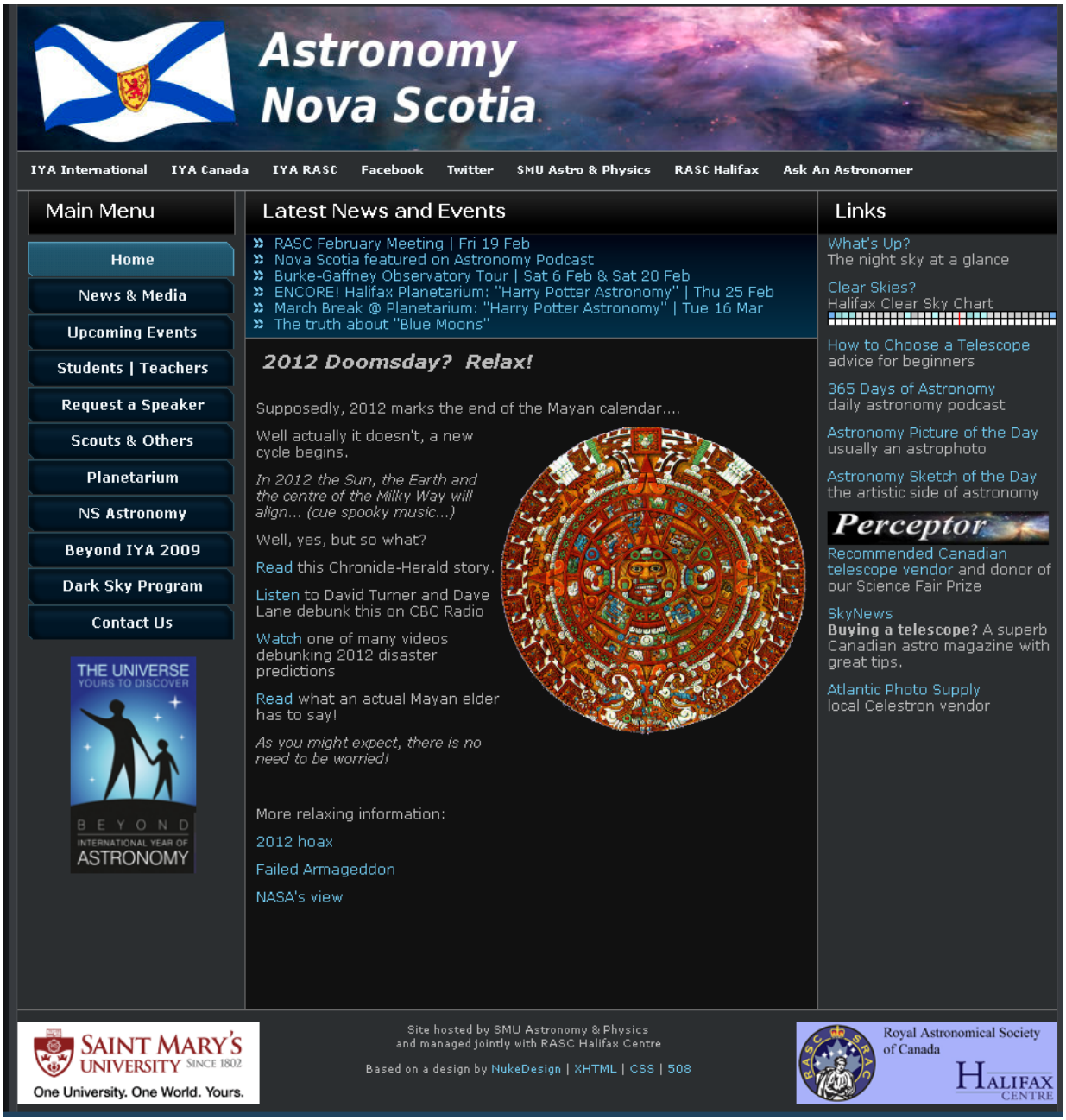

FIG. 3.— The AstronomyNovaScotia website which is similar in concept to the AstronomyCanada website

FIG. 4.— The IYA Beyond Logo

FIG. 5.— The IYA Beyond Logo