

Recognising ‘academic expert’ does not equal ‘education expert’ and the need to facilitate a dynamic, two-way flow of expertise for the future of communicating astronomy

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1. Introduction

In the era of community science, big-data surveys and public outreach, it is unavoidable that astronomy discourses may be guided by a professional who is not trained in astronomy but is considered an expert in their own field (e.g. general education teachers in classrooms). Despite this, the importance of contact with experts who are fully immersed in the discourse (e.g. professional scientists and academics) has not been neglected. In recent years, there has been a clear movement within the discipline to increase the frequency of interaction between academics and the general public. However, this is accompanied by what seems to be a widespread failure to recognise that, although these academics may be domain specific experts in astronomy, they often lack relevant training in education or effective communication, thus hindering the results.

The number of resources available to train and support education professionals in the discourse of astronomy are increasing rapidly, while the same cannot be said for resources to support the increasing public engagement requirements on academic professionals, particularly in the context of sharing their own research. In many academic institutions, there is an endemic deficiency in the provision of guidelines, resources or advice on how to translate the knowledge of astronomy into effective teaching practices with which students can engage and learn. This means that we rely primarily on our experts intuitive knowledge, personal experience and the individual drive of the audience we hope to reach to support engagement and learning. Additionally, there is often the expectation that it is an individual researcher’s own choice whether to develop [waste time on] an understanding of educational theories and practice. Under the increasing pressure for institutions to engage, not just in token outreach programs but, in the opening of effective discourses with the community at large, this practice is no longer proving sustainable. We are now expecting our academics to successfully engage with the full spectrum of possible audiences in a dizzying array of contexts which they may only experience once or twice a year, with little training or support.

2. An Interdisciplinary Approach

The problems of effective outreach and effective tertiary education should not be treated as separate issues. Both arise from a misconception that the years of study

required to become a scientific expert will also somehow produce expertise in communicating that knowledge. While expertise in education, communication and astronomy are not mutually exclusive, neither is one a by-product of the other. We would not expect a senior member of the Faculty of Education to be able to derive any fundamental astrophysical principles. So, why then do we expect senior astronomers to be able to immediately put into practice a full spectrum of educational theories in all manner of contexts?

Sustainable long-term engagement with astronomy is driven both by the opinion of the wider community towards astronomy and the situation within the academic field. However, these are not independent but rather, interdependent. This interdependency can be seen clearly by considering linguistic choices in the discourse of astronomy. There exists a traditional bias in long-respected fields of science, that true understanding is exclusive to experts who have devoted many years to the study of the field. This is the 'expert' discourse and is perpetuated unconsciously by the way we speak and present ideas, both among ourselves as academics and with the 'uninitiated' general public. Conversely, to more effectively communicate ideas and develop true understanding, it is necessary to consider the state, needs and best methods of approach for each audience. In terms of educational theory, this requires considering age, context and pedagogy: what is the developmental age/stage, existing knowledge and experience of the audience; what is the format of the interaction and expected content; and how can this be delivered to promote effective engagement. The intersection between the existing expert discourse and an audience-sensitive discourse is the most effective method for communicating astronomy and consequently, driving the development of astronomy for the future.

3. Immediate & Practical Actions

In an ideal world, we would simply train astronomy academics in the appropriate educational theories and all educators in the discourse of astronomy. In reality, this is unachievable. We need to work as a joint astronomy-education community with recognition that the expertise on both sides is of equal worth. Current imbalances in the perception of the skills and roles of academic experts and their education counterparts is not new and has been limiting the development of astronomy, as an academic discipline as much as a community resource, for many years. With the advent of this era of citizen science and public engagement with astronomy, it can no longer be ignored. Just as it is important to support, train and develop tools for the non-experts of astronomy to engage with astronomical discourse and pass on the knowledge of astronomy in their communities, it is necessary to acknowledge that experts in astronomy require similar support, training and tools to supplement their understanding of effective communication skills which are not inherent in the learning science itself.

We recommend the following immediate and practical actions. Develop an instrument or toolset which is globally relevant so non-experts in education can easily identify and use appropriate educational theories in context. Encourage the academic community to consider that the way they learn may not be the only way to learn, specifically in the context of outreach where the audience's age, context, cognitive capability, experiences and existing knowledge may be in extreme opposition to our own. Address the preconception that it is optional to actively engage students in classes, removing such statements as: "if they are not learning, they are clearly not motivated enough". Finally, we must change the expectation that becoming an academic expert automatically makes someone equipped to be an effective educator or communicator. It is necessary for the future of astronomy to develop a dynamic, two-way flow of expertise with a range of other fields.