Collect, Filter, Connect – People and Ideas - ***CUBEnet three years young and still growing.***

Final Report 2014

Project Number: SI11-2119

Collaborating institutions

The University of Sydney, The University of Queensland, The University of New South Wales, The University of Adelaide, The University of Melbourne,The Australian National University, The University of Western Australia, Monash University, Latrobe University, Victoria University, The University of Newcastle, The University of Western Sydney, The University of South Australia, Flinders University, Griffith University, Queensland University of Technology

Team Members
Professor Philip Poronnik (team leader/University of Sydney)
Professor Ian Dawes (UNSW/ AAS)
Associate Professor Yvonne Hodgson (Monash)
Associate Professor Susan Howitt (ANU)
Associate Professor Janet Macaulay (Monash)
Associate Professor Cathy Abbott (Flinders)
Associate Professor David Saint (Adelaide)
Associate Professor Louise Lutze-Mann (UNSW)

Report Authors

Professor Philip Poronnik, A/Professor Janet Macaulay, A/Professor Yvonne Hodgson, A/Professor Susan Howitt

Australian Academy of Science

CUBENET
Collaborative Universities Biomedical Education Network

<www.cubenet.org.au>

Funding for the production of this report has been provided by the Australian Government Office for Learning and Teaching. The views expressed in this report do not necessarily reflect the views of the Australian Government Office for Learning and Teaching.

Network summary

The network was established with the **overall objective** of generating a critical mass of active tertiary biomedical academics at the national level to create a sustainable framework for a program-wide approach to the biomedical curriculum and to harvest expertise across the university sector at the local, national and international levels.

It is important to note that although the two-year phase of the project has now expired, CUBEnet continues to grow and move from strength to strength. Although this report has been written at the conclusion of the original funding round, in effect it represents an interim report. The remaining funding will be critical for the next phase of expansion in 2014. At the completion of 2014 we will produce a final report to consolidate the complete experience from 2011 – 2014.

The key strategies put in place were to:

- Develop a national identity and unity of purpose within the biomedical "discipline" as a whole
- Put in place "enablers" to allow productive exchange both across the biomedical sciences and other disciplines that contribute to the biomedical sciences more broadly such as biology, maths, chemistry and physics
- Use a consultative process to adapt the Science Threshold Learning Outcomes to develop Biomedical Science Threshold Learning Outcomes
- Develop a national set of "Core concepts"

The outcomes and deliverables to date as a result of implementing the above strategies include:

- An established network with over 200 members national and international
- A website <www.cubenet.org.au>
- 3 National Forums
- Development of the Biomedical Science TLOs (accessible on website and publication in progress)
- Development of Core Concepts in Biomedical Science
- ACER assessment workshops
- LH Martin Leadership workshop
- Sponsoring of other workshops and conferences
- National and international presentations by CUBEnet members and engagement of international colleagues
- Linkages with other science discipline networks
- An ever growing sphere of influence and collaborators – National Committee on Biomedical Sciences of the Australian Academy of Science, Early-Mid Career Researcher Forum of the Academy, Norman Swan (ABC) media, ACDS, LH Martin

Institute, CSHE, ACER as well as the other networks

- Successful grants and EOIs arising as a direct consequence of partnerships initiated and nurtured by CUBEnet
- Publications on network and work group related activity

Contribution to learning and teaching

Why CUBEnet ?

The Biomedical Sciences discipline network, CUBEnet, was formed as a result of a previous forum on Biomedical Education sponsored by the National Committee for Biomedical Sciences of the Australian Academy of Science. To date there has been no national network for tertiary biomedical science educators. Traditionally and not surprisingly, the biomedical science education activities are constrained within disciplinary silos. However, the practices of biomedical research are increasingly multidisciplinary. This situation is partly historical, partly administration/funding driven and partly due to the compartmentalization of the curriculum (often reinforced by "service teaching" requirements). A program-wide approach to the development and delivery of an integrated and flexible biomedical curriculum is critical to ensure the success of our students. The National Committee for Biomedical Sciences thus identified a need for a Forum / network that could bridge the disciplinary gaps and create opportunities for integration and cooperation at the program level of tertiary biomedical science.

The CUBEnet project was therefore initiated with the support of the National Committee for Biomedical Sciences specifically to address this key area of need. The aim was to develop a collaborative network driven by those academics who are directly involved in the learning and teaching of biomedical sciences and to provide a framework that facilitates productive interactions between the biomedical sciences and other national and international networks involved in science education. One of the drivers at the international level for CUBEnet was the *Vision and Change in Undergraduate Biology Education*; a call to action in life sciences education led by the American Academy of Sciences. One of its authors (Dr Nancy Pelaez (Purdue) was a keynote speaker at the inaugural CUBEnet forum. The report calls for radical change in biology curricula which will require broad collaboration and sharing of initiatives for effective change. This call to action highlights the important role that general degrees in the life sciences in acting as a foundation for more specialised professional study and as a means to improve scientific understanding in the community at a broader level.

Since the launch of CUBEnet by the Chief Scientist in Dec 2011, we have made a number of significant contributions to the learning and teaching in higher education at the discipline, institutional, national and international levels as detailed below in this report.

Perhaps the most important achievement to date has been ***the development of a true national identity for tertiary biomedical science educators.*** CUBEnet is now widely recognised as part of the national learning and teaching community and its membership (currently ~200 members) and reach continues to grow. The strong ongoing support of the Australian Academy of Science means that we have access to the Shine Dome in Canberra for our annual forum and this has been a resounding success providing the our members

with a special sense of place.

CUBEnet has developed this strong sense of identity and purpose together with concrete outcomes and as a result has the credibility that allows us to interact with senior level academics and others to start to influence various ideas and agendas around. Importantly the links with the Academy has allowed us to engage with a number of Fellows that support the network and its goals and provide the critical link back to the research that ultimately informs our curriculum. CUBEnet has clearly started to emerge as an entity that can influence and contribute to higher level discussion. This in turn provides all important paths and opportunities for mentoring in leadership and higher education strategy for our more junior members. An excellent example of this was the 2 day workshop run by the LH Martin for CUBEnet and VIBEnet.

Work groups

The initial CUBEnet forum in 2011 resulted in the setting up of work groups based on interests proposed by forum attendees. It was hoped that this would foster interactions across the sector that were based on shared interest and expertise, making it more likely that curriculum change and productive collaborations would develop. The work groups developed with different levels of action and effectiveness, and overall, were probably less successful than hoped. It is likely this is due to a lack of time by participants. Those groups where action did result were usually driven by a 'champion' who had an existing record of interest and achievement in the area. For these people, the work groups provided an effective mechanism for identifying individuals with similar interests and this has led to grant applications and other collaborative activities.

Several work groups surveyed members on their needs and interests. The conclusions from these surveys were similar, with all showing that biomedical science academics would like more support to develop curriculum resources and greater access to existing resources. There was also significant willingness to share. This suggests that there is an ongoing role for CUBEnet in facilitating such sharing through further fora and the website. The Allied Health work group produced a dedicated issue of International Journal of Innovation in Science and Mathematics Education (Vol 21-2 2013) and outstanding outcome for this work group and an example of the way in which CUBEnet brings groups together for a productive outcome. The CUBEnet science communication group led by Susan Rowland from UQ held a Conference that was supported by CUBEnet.

Biomed TLOs

A major project for CUBEnet was to use the network to engage in a consultative process to develop the Biomed TLOs and the Core Concepts. These are now available on the website. Education conferences held by group such as the ACDS (Australian Academy of the Deans of Science), ACSME (Australian Conference on Science & Maths Education) and CUBEnet itself were critical to the development of these national descriptors, by providing a forum for discussion and consolidation of the developed TLOS and Core Concepts.

Presentations

CUBEnet members were very active in representing the network at a number of national and international workshops and meetings.

Leadership and Mentoring

The creation of the network has been productive in fostering links between junior and senior academics in biomedical education. This is assisting in raising the profile of education within institutions in several ways:

- CUBEnet members are acting as promotion or teaching award referees for other members. This is important because it is valuable to have external referees with credibility in national education roles.
- CUBE and VIBE workshops provide a forum in which members can present results of Scholarship of Learning and Teaching studies. This contributes to giving members a national profile and facilitating feedback which can lead to publications and further studies.
- Several grant proposals have developed from the interaction between CUBE and VIBE members. This includes the Mathbench project that arose from the joint CUBEnet/VIBE/QS meeting in 2012 and an EOI on a Framework for Assessment in Biosciences proposal is currently under consideration by the OLT. This proposal represents a large scale collaboration between CUBE and VIBE members (both senior and early career). Even if not funded, the discussions leading to the proposal have still been beneficial in raising awareness of assessment issues and possible solutions and enhancing interactions between different institutions. CUBEnet is also represented on two successful OLT projects on STEM Skills Ecosystems and Graduate Employability.

Factors contributing to productive networking

It is worth reiterating that CUBEnet and the partner biology network VIBEnet have worked very closely together since the inception of these two, in many ways similar networks. When we started the networks, our teams had little experience in projects of this scale and we drew inspiration from the Vision in Biology Education process and specifically invited one of the co-authors to describe the process to us. There is much written on how communities can be established. The initial vision for CUBEnet was a significant on-line presence so our underlying approach for CUBEnet was informed in the first instance by initiatives such as the 12 principles of civilization developed by Cynthia Typaldos of RealCommunities <www.fastcompany.com/41268/community-standards>which have been adopted to on-line collaborations. The 12 principles (contributing factors) are: Purpose, Identity, Reputation, Governance, Communication, Groups, Environment, Boundaries, Trust, Exchange, Expression and History.

Over time CUBEnet has also taken on a very physical presence and we have started to look at ecosystems and collective impact models to further refine how our network should evolve. CUBEnet is represented (Poronnik) on the recently funded “STEM Ecosystems” OLT project as a direct result of our interest in multidisciplinary networks. The leaders of CUBEnet and VIBEnet (Poronnik and Ross) are currently preparing a paper specifically on our collective experience with network formation and sustainability. **This will form the basis of**

our recommendations as to methods for networking for others.

The **major achievements of the network** were its formation and subsequent sustainability over 3 years and into the future. In essence we addressed in part all the 12 principles outlined above. We defined our niche (***purpose***); we have created a solid ***identity*** which is now widely recognised both nationally and internationally as our ***reputation*** is grows; our ***governance*** structure has functioned but will be refined; we have established multiple lines of ***communication*** (website, forums, workshops) for sharing information; we have established working ***groups*** that have had some successes in the form of publications, grants and workshops; through our initiatives we have created an ***environment*** that is a shared space in which to work towards our goals (website, Shine Dome); our structure and identity has defined ***boundaries*** – but these are multi-disciplinary boundaries that we are able to cross due to our collaborations with the other networks; CUBEnet is a ***trusted*** network where we can ***exchange*** ideas and knowledge and can ***express*** ourselves as a group through our interactions both internally and with other networks and related groups. Finally we also have ***history*** where we can track our evolution from the initial National Committee Meeting in 2007.

In more concrete terms, CUBEnet has established itself in a niche that is proving valuable to all those involved. Part of this achievement comes from aligning ourselves with our partner networks, the Australian Council of Deans of Science and the Australian Academy of Science as well as engaging numerous other relevant organisations including the Office of the Chief Scientist, the LH Martin Institute, CSHE at Melbourne and ACER. The combined workshops and conferences that we have hosted/supported are excellent examples of these achievements. Perhaps one of the major achievements of CUBEnet has been in introducing our members to diverse points of view with keynote addresses from experts across a wide range of disciplines – from narrative and visualization to business and the government. This is seen as a very important “value-adding” exercise that our members find refreshing and inspiring.

CUBEnet has a significant profile and as a result is at a point where it can **influence** the various stakeholders. From its inception, CUBEnet has been engaging with heads of school departments and research active colleagues with the aim of raising the profile and importance of teaching and the curriculum in our biomedical schools. CUBEnet is currently driving an active discussion and project around redefining the academic role for the next decade. CUBEnet is creating an environment that facilitates communication across the tertiary sector such that better informed decisions can be made for the future of tertiary learning and teaching.

Barriers to productive networking

Challenges experienced by the network (including general challenges)

The two biggest challenges are **alignment with expectations** and **time**. To be successful we must at least align with and address the expectations of not only our members but also the line managers of our members. Unless they can appreciate the value of participation in CUBEnet activities and support in terms of recognition and facilitation, it is very difficult for junior academics to engage and benefit from the network. Individual engagement with a network relies on the alignment of the expectations and rewards / incentives. This is arguably the major challenge since failure to engage means no network activity.

The other major challenge for the network remains **time**. Currently the network relies largely on the good will and generosity of the participants. Despite the collaborative opportunities and other peripheral benefits such as activities to include on the performance portfolio, there are significant limits to the amount of time that our already time-poor colleagues can commit to network activities. This applies all the way from the management team to the work groups and individuals involved in projects.

Initially, a major anxiety/challenge was that of **recognition** by colleagues and **engagement** with the network. The fact that CUBEnet represents a large number of sub-disciplinary biomedical societies (from physiology, genetics through to biochemistry) means that the big challenge was to differentiate and value add in a space that already competes for the attention of the teaching-research academics. Because there has not yet been a broad national Biomed network to date, there is no good model for how this should evolve. As such the maturation of CUBEnet is an ongoing and "organic process" that could take on a life of its own if it can be sustained over the initial growth phase. The sustained attendance at the national forum events and engagement with the network to date suggests that we have overcome this significant hurdle by providing a valuable entity in that space. Relative to opportunity, this network has evolved remarkably successfully. It takes time to achieve the tangible outcomes that lead to true sustainability – in the case of CUBEnet we suggest of the order of 5 years.

Communication is also a challenge. There were significant challenges in establishing the initial website as we dealt with the issues in defining the workflow and functionality and architecture of the web presence. This has now been partially resolved by investing in professional web development as well as providing administrative assistance to the secretariat to allow updates, mailouts and announcements.

It goes without saying that even if a successful network can be established, **financial support** is always going to be a critical factor and appropriate resourcing and fund raising are key to a sustainable network.

Solutions to the challenges experienced

Part of the success of CUBEnet to date has been the engagement with the Heads of School/Department and the generous financial support given to our annual forums. This has allowed us to maintain a robust financial position. As a result, we have been able to sponsor several workshops run by our members or the other networks. We will also seed some strategic travelling fellowships and projects to provide further incentive for our members. The success of these initiatives will be important in maintaining future funding. In addition,

the engagement with the Heads has also provided opportunities to start discussion around aligning expectations in academic roles. This is an example of CUBEnet using **influence** to address the challenges on multiple fronts. The Academy is also providing significant "in kind" support in the form of free usage of the Shine Dome and related administrative assistance.

In terms of communication, we are continually adapting the website as the requirements of the network evolve. We are in the process of streamlining the site as well as including Facebook and Twitter feeds in response to requests from members. The need for / use of the website is an issue of ongoing evaluation as we explore other avenues for collaborative interactions.

The success of CUBEnet to date suggests that we will be able to sustain activity into the future such that we will reach the 5 year point at which we aim to have a stable and substantial network the activities of which are a highlight on the educational research calendar.

What the network offers

CUBEnet has provided and enacted a visionary platform to support and encourage quality, innovation and multidisciplinarity, in the biomedical curriculum but also in education research. CUBEnet provides a place both virtual (through technology based solutions) and physical (the Shine Dome and face to face engagement) and connects its members across a diagonal slice through the tertiary sector – all the way from the senior executive to the academics and other relevant stakeholders. It also is a place to be exposed to a broad variety of ideas and to experiment and share the outcomes. It provides all members with unique insights into discipline-based education and the impact on their workplace. CUBEnet also acts to collect good ideas and to connect the appropriate groups of people to address these ideas. It also has a role in valuing education and education research and supporting and mentoring staff who focus on these areas of activity. CUBEnet is a collaboration tool, a resource to support, facilitate and mentor the projects and initiatives that are so critical in our future teaching.

The physical location of the Shine Dome and the support and connection with the Academy and the Fellows provides important credibility and a stability of purpose to grow the network.

CUBEnet has also created a diverse nation-wide community of individuals across a very vibrant and active sector. It is inclusive of senior management, research intensive, teaching-research and education focussed biomedical academics. This feature is unique.

CUBEnet has bridged the gap between those academics focussed on research and those academics focussed on teaching. It has created a space - where both of these disparate groups can come together and share ideas not only around on improving learning and teaching in biomedical science, but also in playing a role in setting national priorities for education development, change and innovation.

A recent initiative that could contribute to the valuing of education in the biomedical sphere is exploring the possibility of CUBEnet supporting members to attain fellowship of the Higher Education Academy. HEA fellowship provides formal recognition of an interest in education and a commitment to professional development, potentially adding value by giving education-focussed staff another avenue for external professional recognition. ANU is now accredited to award fellowships and we are discussing options for a program where CUBEnet provides professional development through workshops and individual mentoring, leading to applications for fellowship through the ANU. There is interest from VIBEnet in participating, broadening the opportunity to members of both networks. While this is only in the earliest stages, it is another way in which networks such as CUBEnet and VIBEnet can use their influence and critical mass to support members.

As such it provides an excellent environment for mentoring and leadership training at all levels and a broader understanding and appreciation of the importance of excellence and innovation in biomedical teaching.