

Reflections on the Formation and Growth of the SURE Network: A National Disciplinary Network to Enhance Undergraduate Research in the Sciences

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Abstract

The Science Undergraduate Research Experience (SURE) Network is an academic network comprised of nine Higher Education Institutions (HEI) in Ireland that seeks to enhance the profile of, and practices in, undergraduate research in the Sciences within the Technological Higher Education sector. This paper presents the reflections of the network's leaders on the formation and growth of the network over the period from 2015, just prior to its establishment, to 2020 when the network hosted its seventh undergraduate research conference, published its second undergraduate journal issue, and initiated a coordinated community of practice in response to the Covid-19 crisis. The paper presents the motivations of the leaders for establishing and joining the SURE network, their interpretation of how involvement in the network enhanced practice in their own HEI, their reflections on how their own personal development was enhanced, their interpretation of the factors that have contributed to the success of the network, and the direction in which they see the network going in the future. The collective reflections of the leaders of the SURE Network, as

presented in this paper, provide important guidance for those seeking to establish similar academic networks, both in the area of undergraduate research and elsewhere.

Keywords: academic partnership; authentic learning; distributed leadership; professional networking; research culture; student-centred learning; undergraduate research

Introduction

The importance of high-quality undergraduate research is well understood as both a connection between undergraduate and postgraduate studies (Russell, Hancock & McCullough, 2007) and as a vehicle for the development of essential graduate attributes (Hill & Walkington, 2016). Despite this, the practices related to undergraduate research are perceived by students as distinct from the practices of professional scientists (Healey, Jordan, Pell & Short, 2010), with the focus primarily directed towards the early stages of inquiry and experimentation and minimal consideration for dissemination, peer review and publication. To address this, various undergraduate research conferences and journals have been developed, several of which are reported upon in educational research literature (Hanratty, Higgs & Tan, 2011; Healey, Lannin, Stibbe & Derounian, 2013) and in the literature of specific disciplines (Helm & Bailey, 2013).

This paper describes an academic network that was established to address these concerns for the Technological Higher Education sector (Institutes of Technology, Technological Universities) in Ireland. The motivation for this network, the Science Undergraduate Research Experience (SURE) Network, is reinforced by Higher Education policy in Ireland where the demand for enhanced connections between Higher Education Institutions (HEIs) is set out (DES, 2011), as is the demand for enhanced performance in research (DJEI, 2015a).

Since its establishment in 2016, the SURE Network has implemented seven undergraduate research conferences, launched an undergraduate research journal with two issues to date, and initiated a curriculum enhancement project through which partner HEIs in the network share practices and resources. The curriculum element of the network is playing a particularly significant role during the move to primarily online delivery in Ireland's HEIs due to the Covid-19 pandemic.

Several papers have already dealt with aspects of the network's activity, such as the use of digital badges to recognise engagement in undergraduate research (O'Brien, 2019), and the objectives of the curriculum project (Montgomery, 2020). Other papers evaluating the medium-term impact of conference participation on graduates' attributes and addressing the network's role in addressing the impact of the Covid-19 pandemic on laboratory projects are forthcoming. This paper fulfils a different objective by reporting upon the reflections of the leaders of the network on the impact of the network, and providing the story of the formation and growth of the network.

The leadership of the network is widely distributed across nine HEIs, with each of the co-authors of this paper playing the role of chair or co-chair of committees either at a national or local level or occupying other leadership roles in the network's projects. The number of co-authors on this paper attests to the distributed leadership of the network. The reflections that are reported are representative of all those leaders' considered views on the network, its impact, and its growth. There are, of course, many others involved in the network in a variety of roles at local level in the nine partner HEIs.

This paper is of value to two audiences. Firstly, for those concerned with the enhancement of undergraduate research, this paper provides the story of a successful intervention on a national scale. Secondly, for those interested in the growth of an academic network, this paper provides insight into the factors that have supported the SURE Network to develop. The distillation of the authors' reflections into a set of recommendations for practice will be of value to HEIs, individuals and partnerships elsewhere that are seeking to meet comparable objectives.

Undergraduate Research

Undergraduate research includes a variety of curricular and co-curricular activities that are undertaken by undergraduate students or recent graduates based on the research work that they completed as undergraduate students. The final year project is the most notable research activity undertaken by undergraduate students (Healey *et al.*, 2013). However, other activities are implemented by programme teams to enhance their students' research skills and the profile of research as a future career (Walkington, 2015). These include research internships, research case studies and even engagement with research as part of student induction. An emphasis on undergraduate research in the curriculum provides an opportunity for a new type of pedagogy, described by Walkington (2015) as "students as researchers" (p.5). This approach mainstreams research-based pedagogical activities throughout the curriculum, enabling students to enhance the depth of understanding of their subject area through engagement with a professional research process. As argued by the author,

As academics, we achieve our highest levels of understanding when we carry out research which is then communicated to others through teaching or at conferences and in published work. The challenge of a 'students as researchers' approach is to open the same freedom up to our students. (Walkington, 2015, p.29).

The creation of a research culture among undergraduate students (Garde-Hansen & Calvert, 2007) has been shown to assist undergraduate students in developing important graduate attributes and helping shape career decisions. Hill & Walkington (2016), for example, interviewed participants in a national undergraduate conference in the UK and identified self-confidence, professional understanding and oral communication among the graduate attributes that could be related to the students' participation in that conference. Though often considered primarily transferable or *soft* skills, the graduate attributes that emerge from an undergraduate research culture can be central to the graduate's discipline. Helm & Bailey (2013) highlight the connection that emerges between the student and their future profession when they participate in undergraduate research conferences, demonstrating an enhancement of students' motivation related to their profession. Russell *et al.* (2007) demonstrate how engaging in undergraduate research helps clarify students' knowledge of, and interest in, careers in their discipline, including raising their expectation of pursuing postgraduate research opportunities. Undergraduate research opportunities such as conferences and publishing in journals also offer students an opportunity to celebrate and showcase their academic achievements at the conclusion of their undergraduate studies (Healey *et al.*, 2013). Internationally, interest in developing these opportunities and promoting the pedagogical and professional value of undergraduate research continues to grow. This is driven by organisations such as the Council on Undergraduate Research (<http://www.cur.org>) in the US, the British Conference of Undergraduate Research (<http://www.bcur.org>) in the UK and comparable organisations in other countries. In Ireland, various organisations have supported the development of practice in undergraduate research and there are several examples of good practice case studies (Hanratty, Higgs & Tan, 2011). These include the Dublin Region Higher Education Alliance's undergraduate research conferences from the early 2000s, the University of Limerick's All-Ireland Conference on Undergraduate Research and the

activities of the National Academy for the Integration of Research, Teaching and Learning (NAIRTL).

The importance of undergraduate research in Ireland is underscored by the call in the National Strategy for Higher Education (DES, 2011) for enhanced integration between teaching and learning and research. One approach identified in the strategy is the development of a research-based curriculum, identified as one that “includes activities in which students actually conduct research” (DES, 2011, p.54). These activities can be combined with Ireland’s ambition to enhance its performance in research (DJEI, 2015a), and its call for integration between research and enterprise (DJEI, 2015b). This represents a clear policy direction for Ireland’s HEIs to work with each other and with partners to enhance research at all levels, and emphasises the need for those achieving honours degrees to be able to, *inter alia*, “use advanced skills to conduct research” (NFQ, undated, p.2).

There is a view that the technological sector in Irish higher education has traditionally faced a challenge in developing a research culture (Houghton, 2020). The sector has, however, built up substantial expertise in a wide range of research areas. Starting from a solid foundation in STEM (Science, Technology, Engineering, Mathematics) research in the 1990s, the sector has broadened its research capability and has been successful on the national stage in securing major investments to set up research infrastructure and build critical mass. The sector is now undergoing a transformation as Institutes of Technology are applying as partnerships for redesignation as technological universities. To achieve this objective, their engagement with (primarily applied) research must meet legally defined thresholds both at the time of application and according to a predicted future trajectory (Technological Universities Act 2018). Now more than ever the need to emphasise and further enhance the

profile and culture of research in the technological sector is of crucial importance, as is the need to ensure a pipeline of future research students. Undergraduate research offers the potential to play a strategic role in the achievement of both objectives.

The SURE Network

Objectives and Structure

The SURE Network was established in 2016 as a national, disciplinary network with the following purpose: to form a community of institutions and people interested in enhancing practice in undergraduate research in the Sciences. It is a network of nine HEIs from the Technological Higher Education sector in Ireland. At its second meeting, the network agreed on the objectives set out in Table 1.

Table 1 SURE Network Objectives

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| <ul style="list-style-type: none">● To provide a shared space where resources can be exchanged, disseminated and stored for use by others.● To form a community where connections can be formed on a national and/or regional basis to enable the establishment of inter-institutional initiatives.● To provide a platform which can be used by institutions to collectively apply for sponsorship and funding. |
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Since 2016, the network has run seven conferences for undergraduate students, launched an undergraduate journal and implemented a number of curriculum enhancement initiatives, most notably a community of practice to support HEIs in adapting their final year laboratory projects following the closure of laboratories due to the Covid-19 pandemic.

The network is recognised as a disciplinary network by the National Forum for the Enhancement of Teaching and Learning in Higher Education (who also provide webspace - <http://sure-network.ie/>). The network has also had the support of the Technological Higher Education Association (THEA), various professional bodies and enterprise partners, and all member HEIs.

The network is organised as a hierarchy of committees, with the National Committee having representation from all partners and a chairperson who serves for a period limited to three cycles of the conference series. Reporting into the National Committee are the four committees shown in Figure 1. For each iteration of the conference series local committees are also established. All committees have agreed terms of reference published on the SURE Network website (<http://sure-network.ie/about/committees/>).

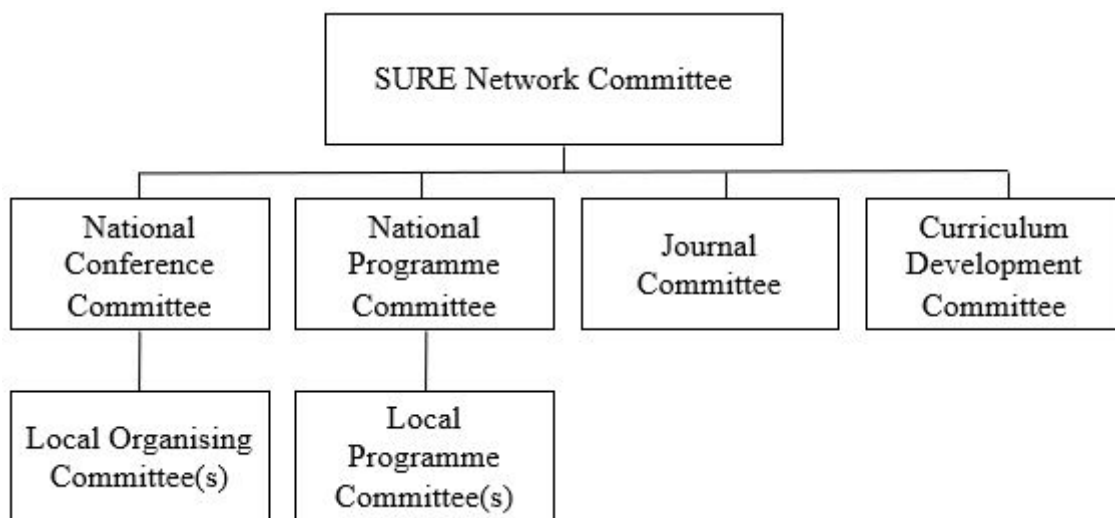


Figure 1 SURE Network Committee Structure

The SURE Network has been recognised nationally for its contribution to Higher Education practice. Following a successful submission by the National Conference Committee, the SURE Network was awarded Best Academic Partnership at Ireland’s Education Awards in 2019. At the opening of the 2019 conference series, Minister for Higher Education Mary

Mitchell O'Connor described the SURE Network as "a shining example of the sector working together to share experiences and to build capacity" (SURE, undated).

SURE Undergraduate Research Conferences

The network aims to organise three undergraduate conferences each year serving different regions of Ireland. All three conferences take place at the same time. In September 2018 the network hosted conferences in Dublin Institute of Technology, Athlone Institute of Technology and Waterford Institute of Technology (<http://sure-network.ie/conference/sure2018/>) with 27 oral presentations and 67 poster presentations from students who had recently completed their undergraduate studies. In September 2019 the network again hosted three conferences, this time in Technological University Dublin, Institute of Technology, Sligo and Institute of Technology, Carlow (<http://sure-network.ie/conference/sure2019/>) with 23 oral presentations and 67 poster presentations. In 2020, the network was due to host three regional conferences in Technological University Dublin, Galway-Mayo Institute of Technology and Cork Institute of Technology. However, due to the restrictions in place relating to the Covid-19 pandemic these conferences were replaced with a single online conference that took place in October 2020, with 24 oral presentations and 35 poster presentations. All presenters at the conferences are recognised with the awarding of a digital badge (O'Brien, 2019). Prizes are awarded for the best presentations.

The National Conference Committee and Local Organising Committees organise each conference event, and the National Programme Committee and Local Programme Committees organise the review of submissions and selection of presentations. The Programme Committee allocates papers to 40-50 reviewers each year, distributed across all partner HEIs. The audience for each conference is primarily students who are commencing

their final year projects at the time of the conference. In addition to oral and poster presentations, each conference includes keynote addresses, workshops and panel discussions. Researchers and enterprise representatives are invited to participate in these sessions, which are designed to stimulate attendees' thinking regarding their future careers. The titles of some of these sessions has included *From academia to research to industry: the truth I would have told myself* and *Postgraduate research experience - Funding opportunities and stories from the front line*. Each conference series to date has been opened by a government minister.

SURE Undergraduate Research Journal

The SURE Network Journal, SURE_J (<http://sure-network.ie/journal/>), launched its first issue in 2019 with five papers published following a rigorous peer review process. All papers in the first issue were based on presentations at the 2018 conference. Following the first issue, the journal has opened submission to authors reporting on their undergraduate research in the Sciences, whether presented at the SURE conference or not.



Figure 2 SURE_J downloads from September 2019 to September 2020.

The journal is open access, free of charge for all readers and is underpinned by a Creative Commons licence whereby authors retain ownership of their articles. In the year since its launch, there have been 894 paper downloads from across the world (see Figure 2).

SURE Network Curriculum Development

The SURE Network's Curriculum Development strand has the objective of broadening consideration of undergraduate research across the whole curriculum. This includes the development of connections within the curriculum to the conference and journal, aligning with best practice (Garde-Hansen & Calvert, 2007; Walkington, 2015). The Curriculum Development Committee has set itself the objectives shown in Table 2 (Montgomery, 2020).

Table 2 SURE Network Curriculum Development Objectives

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| <ul style="list-style-type: none">● To develop models for the integration of the undergraduate conference and the undergraduate journal in the curriculum;● To investigate existing undergraduate research models nationally and internationally;● To research and develop models, guidelines and recommendations for undergraduate programme teams that are seeking to further integrate research in their curriculum. |
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To date, the committee has undertaken national surveys of students, lecturers and industry to identify best practice and areas for development. Responding to the Covid-19 crisis, the Curriculum Development Committee established a Covid-19 Emergency Response Team with membership from six partner HEIs. The objective was to examine how final year projects could run in the 2020-21 academic year with reduced laboratory access for students. The team created five Communities of Practice (see Table 3) to support the roll out of alternative project types whilst retaining a focus on the assessment of essential learning

outcomes. The Communities of Practice attracted a membership of over fifty academic staff from seven HEIs nationally, thus creating a dynamic platform where individuals and institutions could share experiences and resources.

Table 3 Covid-19 Emergency Response Team Communities of Practice

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| <ul style="list-style-type: none">● Group or individual projects with shared simulated and/or real-time laboratory data sets;● Social research-based projects, employing qualitative methodologies;● Systematic reviews and meta-analyses;● Extended research proposals and grant applications;● STEM educational projects. |
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In many respects, the SURE Network has sought to achieve objectives that are common to similar initiatives internationally (Healey *et al.*, 2013; Helm & Bailey, 2013; Hill & Walkington, 2016). However, there are dimensions to the story of undergraduate research that can be told by the SURE Network that are less well explored by the literature, including the development of collaborations to support practice enhancement. Professional networking, such as networking enabled by collaborations, has substantial value for academic staff, both in terms of the development of their research (Lowrie & McKnight, 2004) and for the enhancement of their teaching practice (Patariaia, Margaryan, Falconer & Littlejohn, 2013). The authors of this paper consider networking and the development of collaborations to be a particular strength of the SURE Network.

The remainder of the paper reports upon the authors' reflections and insights into the formation, growth and impact of the network. The next section sets out the approach adopted by the authors to reflect upon the Network's story, and to shape the reporting of this story.

Approach Adopted

This paper is co-authored by twenty-seven leaders of the SURE Network. As co-authors, rather than contributors or research participants, each of the leaders of the network has made a significant contribution to the paper as they have to the development of SURE Network itself. The story would be different without all co-authors' considered reflections on the story of the network and their authoring of sections or contributions to the review of referenced literature.

The approach taken centres on the analysis of authors' individual reflections. Each author engaged in a reflective exercise centred upon six questions (see Table 4). The collection of reflections enabled a qualitative analysis and inductive search for key themes through a stage of open coding followed by categorisation of codes (Miles, Huberman & Saldana, 2013). This resulted in 590 codes, 41 categories and 5 thematic areas.

Table 4 Questions used to reflect upon their role in the SURE Network

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| <ol style="list-style-type: none">1. Why did you and/or your institution join the SURE Network?2. In your view, how, if at all, has your Institution's involvement in the SURE Network enhanced practice in undergraduate research in the Sciences in your Institution?3. In your view, what factors, if any, have contributed to the success of the SURE Network in your institution and/or more broadly?4. In your view, how, if at all, has involvement in the SURE network aided your own professional development?5. In your view, in what ways, if at all, does the SURE Network need to improve or change for the future?6. In your view, what else, is anything, should be considered in telling the story of the formation, growth and future of the SURE Network? |
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These thematic areas that emerged from the analysis, and the sub-categories within each thematic area are:

1. Joining the SURE Network. In this thematic area, the sub-categories were: relating undergraduate research to role; seeing personal value of involvement; having involvement in prior conference; wanting to learn from other institutions; supporting student-centred learning; and enhancing research practice.
2. Enhanced Practice in your Institution. The sub-categories in this thematic area were: inspiring and engaging students in research culture; enhancing students' confidence, skills, perspective, outlook and career planning; disseminating and providing profile for undergraduate research and research in general in the technological sector; validating local practice and developing knowledge of practice elsewhere; sharing of practices, resources, knowledge and experience in a community of practice; developing institutional and personal collaborations; enhancing curriculum design and implementation, primarily the final year project; responding to the Covid-19 crisis; and developing or enhancing the research culture and staff development.
3. Personal and Professional Development. The sub-categories were: validating and comparing personal practice; building personal profile in own institution; valuing role as reviewer, organiser or leader; developing and sharing knowledge and experience; building professional network and enhancing relationships; enhancing personal research practice; and enabling personal reflection.
4. Success factors. The sub-categories were: benefitting from inclusivity, enthusiasm, commitment, collegiality and trust; distributing leadership and ensuring ownership and communication; having clarity and relevance of shared objectives; getting support from

university leadership; getting support from external bodies; positioning conference as a focal point; and recognising the quality of underpinning research.

5. The Future. The sub-categories were: attracting funding for the future; expanding the network; consolidating the success of the network; enhancing the agility and responsiveness of the network; adapting for the digital world; enhancing the curriculum activity; engaging with the network of alumni; formalising the strategy, objectives and structure of the network; enhancing the profile of the network; continuing to build communities of practice; enhancing student involvement in the network; and building connections with postgraduate research.

What follows in the remainder of the paper is the story of the formation and growth of the SURE Network, shaped by thematic areas and organised into sections on formation, enhancement of practice and key enablers, as well as a section on recommendations for practice.

Formation

In spring 2013, the College of Sciences and Health in Technological University Dublin, then part of Dublin Institute of Technology, underwent a College Review as part of a quinquennial quality assurance process. One of the recommendations from the review was for the College to explore how research and innovation could be further integrated into the undergraduate curriculum. During a discussion related to this matter at the College's Learning, Teaching and Assessment Committee, two members of the committee proposed the development of an undergraduate research conference and journal to which students in the College could submit their work, and which could be integrated with the curriculum. The proposal drew upon the members' own research on student-centred approaches to curriculum implementation, in particular the relationship between student ownership and graduate attributes (Dunne, 2014;

Ryan, 2013). The proposal further drew upon the members' awareness of research taking place in the UK related to "students as researchers" (Walkington, 2015, p.5) and the enhancement of final year projects (Healy, 2013). The College agreed to proceed with the project and invited Institute of Technology, Tallaght and Institute of Technology, Blanchardstown (all three HEIs would become the founding HEIs of Technological University Dublin) to become partners for an undergraduate research conference. The inaugural conference took place in November 2015 (<https://www.dit.ie/colleges/collegeofscienceshealth/conf/>), with nine oral presentations and sixteen poster presentations, as well as workshops and keynote addresses from research leaders, enterprise partners and professional body representatives. The provision of research-focussed, and career-focussed workshops for an audience that was primarily incoming final year students was an important component of the design of the conference and a key motivation for the organisation of the conference.

The three partners began planning for a second conference to take place in the Institute of Technology, Tallaght in November 2016, but due to an industrial relations issue relating to the formation of the technological university, and unrelated to the conference, it could not proceed. The organisers saw this as an opportunity to rethink the direction for the conference and determined that the model developed in 2015 could serve as a template for a national conference. It was agreed that the partnership should be broadened across the technological higher education sector. The organisers wrote to the Heads of Science in all Institutes of Technology in the country inviting them to nominate a representative for a national network on undergraduate research. Having received nominations from eleven HEIs, an initial online meeting took place in December 2016, and a face-to-face meeting took place in Athlone

Institute of Technology in January 2017. At the January 2017 meeting, the title of the network, its purpose, its objectives (as set out in section 3) and its chairperson were agreed. The representatives from each of the partners were, in most cases, the staff who were responsible for final year projects in the Sciences in their HEI. With few exceptions, the representatives were academic staff rather than management. Their motivation, and the motivation of their HEIs, to become involved in the network was primarily driven by a commitment to student-centred approaches to teaching and learning, the provision of authentic learning experiences to students and the enhancement of the profile of their undergraduate research. Partner HEIs also predicted the opportunity this would afford them to enhance research practice in their HEI and develop meaningful collaborations with others. Individual members of the network committee additionally saw the opportunity for personal development through their own involvement in the network. The development of these opportunities is reported upon in the remaining sections.

Enhancement of Practice

There are several ways in which involvement in the SURE Network has enhanced practice in the constituent HEIs, many of which are aligned with the literature (Hill & Walkington, 2016; Russell *et al.*, 2007). While an in-depth study on the long-term benefits to student participants in the network's activities is due to take place through the network, the authors can report at this time on their knowledge of how student-centred practice has been enhanced. Students having access to an authentic research process has enabled them to engage with, and contribute to, a professional research culture and provided them with a more complete overview and understanding of the scientific method. The authors have observed the benefits to students in terms of their confidence and communication skills as well as the development of their understanding of postgraduate research opportunities, and, in some cases, a

transformation of the outlook on their career. The engagement of final year students in a discussion regarding their career options is one of the defining objectives of the conference series. In order to support this objective, the winner of the Best Communicator prize at one of the 2019 conferences returned to participate in the 2020 conference, discussing her own experience of presenting her undergraduate research and her progression to postgraduate research.

A strength of the SURE network relates to the collaborations that now inform the undergraduate research activities of the partners. This has enhanced practice in many partner HEIs through the sharing of practices, resources, knowledge and experience, either explicitly through the Curriculum Development strand of the network, or implicitly through the exposure offered by the conference and journal review and presentation processes. In many cases, this has enhanced the design and implementation of undergraduate curricula in the partner HEIs, in particular the final year project. This has also had the benefit of enabling partners to validate their own practice through comparison with practice elsewhere.

Importantly for the technological higher education sector, involvement in the SURE network has helped enhance the profile of research in several of the partner HEIs. By providing a platform for students to disseminate their research, academic staff are made aware of research activity taking place elsewhere in the technological sector and are, in some cases, encouraged to become more directly involved in research. Given the attendance at the conferences of professional bodies, enterprise partners and government ministers, the SURE network has served as a platform to highlight the research output of the technological higher education sector to key stakeholders and the wider research community. The network has enabled the development of collaborations across partners that would not have taken place otherwise. In addition to the formal collaborations relating to the activities of the network, two partners

have developed a shared research project and recruited a PhD student, owing to the connections formed through the network.

The value of the collaborative platform enabled by the network was particularly apparent during the Covid-19 crisis. With reduced laboratory access for all students, the Communities of Practice have supported partners in effectively completing final year research projects in the 2019-20 academic year, and in preparing for the 2020-21 academic year. The rapid response of the SURE Network, through the special working groups, is an excellent case study of the adaptability, the congeniality and practicality of the network and its members. The engagement of the network and the practical support it offered to members (and non-members) was focussed on ensuring student success at a particularly difficult time.

In addition to being of value to HEIs, the leaders of the network have identified how involvement in the SURE Network has had value for their own and their colleagues' personal professional development, through the development of their professional network internal to their HEI and across partner HEIs. Involvement in the SURE Network has enabled members to validate and compare their personal practice with practice elsewhere, triggering personal reflection on their educational philosophies and practices. The network has provided a space for engagement with likeminded practitioners as well as a space in which personal beliefs and practices can be challenged and evolve, reflecting findings elsewhere that networking enriches and diversifies the knowledge and skills of academic staff and results in changes to teaching practice (Patarraia *et al.*, 2013). Additionally, the opportunity to lead on projects and committees with a national profile has enabled leaders of the network to develop their own organisational, managerial and leadership competences, to their personal and professional benefit.

Key Enablers

The successes to date of the SURE Network are due, in the views of its leaders, to a range of factors. In particular, the network has benefitted from the inclusivity, enthusiasm, commitment, collegiality and trust that is shared among its members. There are also areas in which the network needs to improve and directions in which it needs to evolve in order to enhance its effectiveness and ensure long term sustainability. This section deals with these matters.

The leadership of the network is deliberately distributed across a multitude of clearly defined structures, projects and committees. This is required in order to enable effective project management at the scale required for the activities and objectives of the SURE Network. With such a structure, there is a need for a large group of people to feel a connection to the network, and to volunteer to take ownership of aspects of the network's activity. The willingness of the representatives of each of the partner HEIs to put themselves forward, to take ownership and to lead on aspects of the network's activity has played a vital role in the development of the network. Given the distribution of leadership, the communication channels among the parts of the network are especially important. The SURE Network Committee meets 7-8 times per year, including one face-to-face meeting. These meetings provide opportunities for each of the strands of the network to come together and report on their activity. The annual face-to-face meeting enables the network to reflect upon the previous year and carry out workshops exploring its future direction. The role of the conference is key in enabling communication within the network. Having an occasion each year where SURE Network leaders and members, other academic staff and students from a region are co-located for a full day enables informal discussion and exploration of ideas that would not otherwise be easily achieved.

The SURE Network adopted, at its second meeting, a purpose and a set of terms of reference for its committees. These have been of value in ensuring a shared understanding of the boundaries of the network's activities and reinforcing the shared vision and objectives of the network. With such initiatives there is always the potential for scope creep and the dilution of the core mission that triggered its establishment. The SURE Network has sought to encourage the development of initiatives under its banner while ensuring that the network's eye remains firmly on the prize of enhancing undergraduate research. There are opportunities for a future constitution of the network to address areas of emerging interest in the network, such as the alignment with other national and international organisations. The development of such a constitution could also formally recognise the value of partnerships between the network and enterprise partners, professional bodies, HEIs and national organisations such as the National Forum for the Enhancement of Teaching and Learning in Higher Education - partnerships that have emerged over the first four years of the network.

The support, in many cases, of the leaders of the partner HEIs has been of great value to the network. This has enabled the network to develop an interface with THEA - the Technological Higher Education Association, through their network for Heads of Science. It has also enabled the network to attract funding from HEIs for its activities. While this has been of value, the network recognises the importance of exploring alternative avenues to attract funding for its future activities. Having established a firm foundation, the opportunity is there for the network to apply for funding to support the next phase of its operation, underpinned by a formal constitution and a strategic plan developed in consultation with key stakeholders.

Above all other factors, the key to the success of the SURE Network in its early years has been the quality of the underpinning research conducted by undergraduate students guided by their academic supervisors. The SURE Network has played an enhancement role by providing a profile for this research and by enabling partners to observe and engage with the research taking place elsewhere. However, this could not have taken place without a starting point of high-quality undergraduate research. The network can further build upon this in the future by exploring ways in which students, supervisors and past presenters can become more directly involved in the design of the network's activities.

The network has acquired a great deal of experience since its establishment, enabled by the factors explored in this section. The next section provides a set of recommendations for practice that may help inform similar initiatives elsewhere.

Recommendations for Practice

The story of the SURE Network demonstrates how one network was implemented according to an approach that has supported it in achieving some success over a four-year period. The recommendations presented in this section are derived from the reflections of the leaders of the network on how the network was formed and its impact over time. While it is recognised that this represents just one of several possible approaches, it is expected that the following five key recommendations will be of value to others.

Recommendation 1 – Open Up: The SURE Network's origins reside in an initiative that commenced on a committee in a single HEI and then grew to three HEI, thus setting the foundation for a national network of eleven, then nine, partners (following the merger of three partners). There are similar initiatives in other institutions that can bring considerable

value to themselves and other HEIs by looking for ways to open up, involve others and achieve scale. The first recommendation of this paper is for HEIs to seek out opportunities to open their initiatives up to others.

Recommendation 2 – Distribute: The leadership model of the SURE Network is distributed broadly across multiple HEIs and many individuals (as reflected in the authorship of this paper). The distribution of leadership enables experience to be gained and shared, supports succession planning, and draws on the multidisciplinary experience of practitioners. It also assists with engaging partners and sharing ownership over initiatives and projects.

Recommendation 3 – Focus: Clarity of focus is of great importance in trying to achieve shared objectives across multiple partners. In the context of undergraduate research, maintaining an underpinning focus on authentic, student-centred learning has helped ensure that all members of the network can explore opportunities while occupying a common ground. This focus should be reflected in the structures and terms of reference for the partnership.

Recommendation 4 – Engage: Make it as easy as possible for people to engage. There are different ways in which people can contribute to educational innovations. For the SURE Network, some people chose to engage as reviewers and contributors to communities of practice, while others took on leadership roles on a short-term basis, others on a long-term basis. The SURE Network has been enriched by its welcoming of new voices and perspectives on different timescales and through different routes.

Recommendation 5 – Adapt: The SURE Network responded quickly to the Covid-19 crisis through the establishment of communities of practice and by converting its plan for three regional, on-campus conferences to a single, national online conference. The network looks forward to learning from these pivots and exploring the opportunity to build these, in some way, into longer term adaptations of the network’s activity.

Concluding Remarks

The SURE Network has grown over the past four years into a robust, successful, national network. The network has supported the development of practice in its constituent HEIs, has enabled professional development of the academic staff that lead the network as well as their colleagues, and has provided rich opportunities for hundreds of students who have disseminated their work nationally and internationally through the conference series and the journal. Following a shared, considered reflection on the impact of the network since its establishment, the leaders of the network have used this paper to document the story of the SURE Network and provide recommendations to others who may embark on a similar journey.

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Although this is a co-authored paper, as the first chairperson of the SURE Network I would like to take this opportunity to acknowledge the contributions by, and commitment of, all of the paper’s authors and the scores of academic staff and hundreds of students who have been involved in the SURE Network’s activities since its establishment. These are the people who have built the story that is told in this paper and who have brought the network to what is now simply the end of its beginning. As I hand over the chairpersonship at the end of the third iteration of the SURE conference series, I do so in the knowledge that the network has a

bright future in the hands of talented, dedicated and visionary academic staff throughout Ireland. - Ciarán O’Leary, SURE Network Chairperson, 2016-2020.

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