STEAMING AHEAD: TOWARDS EMBEDDING STEAM IN IRISH YOUTH WORK

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IN 2012, THE NATIONAL YOUTH COUNCIL OF IRELAND (NYCI) hosted its national conference on the theme of digital tools in youth work. The Screenagers conference brought youth workers together to discuss the potential of digital technology to contribute to youth work's mission to empower young people and enable them to become creators rather than consumers in the digital world. The conference, and follow-up international conference, highlighted that many youth workers think that it is important to include technological innovations in youth work to keep it relevant to young people, but there were also considerable anxieties, with many feeling they were insufficiently trained and that they did not have the right resources. This was particularly so when trying to move beyond the basic uses of technology (to arrange activities and provide information, for example) and use it in more creative ways. From 2014 to 2016, NYCI led the international Erasmus+ funded Screenagers research project, which involved five partners, engaging with 1865 youth workers and young people through case studies and focus groups in Austria, Denmark, Finland, Northern Ireland and the Republic of Ireland. NYCI surveyed

and interviewed 283 Irish youth workers to further explore the training and support they would require to enable them to use technology more effectively in youth work. Subsequently, NYCI catalysed and partnered in a range of domestic and European projects to address needs. The publication of the sectoral-led research (Harvey, 2016) signalled a turning point for digital youth work in Ireland.

During the same period, Camara Education Ireland established the TechSpace Programme in 2012 with the vision 'to be a national movement that aims to change the lives of young people in Ireland by becoming Ireland's leading creative technology network for outcome-focused youth development'. Camara develops and delivers digital and STEAM (Science, Technology, Engineering, Arts and Math) capacity-building programmes to 222 youth services engaged in the TechSpace Network. The TechSpace model is based on The Clubhouse Network, a global community for creativity and achievement through technology originating from the Media Lab at Massachusetts Institute of Technology and the Boston Museum of Science. Between 2014–2016, the ESB funded Camara to develop an evidence base for STEAM in youth work in Ireland. The TechSpace Maker pilot project trained and supported 20 youth workers to deliver Maker activities to 150 young people. The pedagogy was informed by the world-renowned Clubhouse model and Tinkering Studio at the San Francisco Exploratorium.

In 2016, NYCI, with its expertise in delivering systemic capacity-building programmes and research on the technology-related support needs of the youth sector, and Camara, with its experience of addressing such needs through its pedagogical and technological specialism, joined forces. NYCI and Camara successfully secured funding from Science Foundation Ireland (SFI) to design and deliver the STEAM in Youth Work Maker project out across Ireland. SFI were impressed; the previous year, it had found that young people from disadvantaged socio-economic backgrounds are likely to be disengaged from science (Science Foundation Ireland, 2015). In recognition of the youth sector's ability to engage this same cohort of young people and its potential to deliver STEAM education in exciting and innovative ways, SFI provided two-year funding. This would allow NYCI and Camara,

through TechSpace, to train and support 320 youth workers from across Ireland to deliver STEAM and Maker projects to well over 4,000 young people, most of whom wouldn't have had access to out-of-school STEAM education otherwise (Meister 2017).

In addition, NYCI were nominated by the Department of Children and Youth Affairs to represent Ireland on a European Commission expert group set up under the European Union Work Plan for Youth 2016–2018. The group recently published a definition of digital youth work (European Commission, 2018), an umbrella term used for digital and STEAM youth work in Ireland.

Taken together, these initiatives provide a basis for engaging the youth work sector systematically and on a bigger scale than had been possible prior to that.

ENGAGING THE YOUTH WORK SECTOR

Bringing STEAM education to the youth work sector offers huge potential in terms of the relational and process outcomes of youth work, such as those linked with social, emotional and mental wellbeing. Examples include:

- through emphasis on group work and self-expression and in offering emerging digital tools to engage young people
- in supplementing formal education through the provision of enjoyable, hands-on, inspirational experiences of STEAM, that are relevant to young people's lives (Department for Education and Skills, 2016)
- in allowing young people to develop 21st century skills (creativity, problem-solving, critical thinking and team working), so critical to their engagement with society and futures (P21 Partnership for 21st century skills, 2007).

While it is still early days, preliminary findings from the evaluation of the NYCI TechSpace STEAM in Youth Work Maker Project show that youth workers believe the inclusion of STEAM within youth work is supporting such outcomes. For youth workers themselves, emerging findings indicate that most of those who take part really enjoy training and support around

STEAM; want to continue to develop their practice in this area, and to have access to further support; and their perceptions about STEAM and its relevance to youth work develop.

The other major benefit to the involvement of the youth work sector in STEAM and Maker education is its ability to engage young people who are at risk in terms of educational disadvantage. Working through the youth work sector ensures the project focuses on disadvantaged young people because the sector works with young people who are significantly more disadvantaged than the national average (53% vs. 14%) (NYCI, 2012). This is particularly important as many other non-formal STEAM engagement initiatives, outside of the youth sector, struggle with this (Archer & DeWitt, 2017). Our preliminary findings indicate our project is improving equality of access to hands-on, inspiring, informal STEAM opportunities in Ireland. For example, over half of the youth workers we have trained will go on to facilitate STEAM and Maker activities with early school leavers, while a third will work with young offenders and a third will work with young people who experience addiction.

LEARNING THEORIES, CONCEPTS AND METHODOLOGIES

Experiential learning, a mainstay of youth work processes, is inspired by the work of Dewey, Lewin and Piaget and strongly associated with the work of David Kolb. Kolb's (1984) Experiential Learning cycle is a theoretical framework used by youth work organisations in Ireland to inform the design, delivery and overall approach of youth work activities (Devlin & Gunning, 2009). Mark Smith, in his seminal book Creators not Consumers (1980), discusses experiential learning (learn by doing) in a youth work context and how it is based on three assumptions:

- people learn best when they are personally involved in the learning experience
- knowledge has to be discovered by the individual if it is to have any significant meaning to them or make a difference in their behaviour
- a person's commitment to learning is highest when they are free to set

their own learning objectives and are able to actively pursue them within a given framework

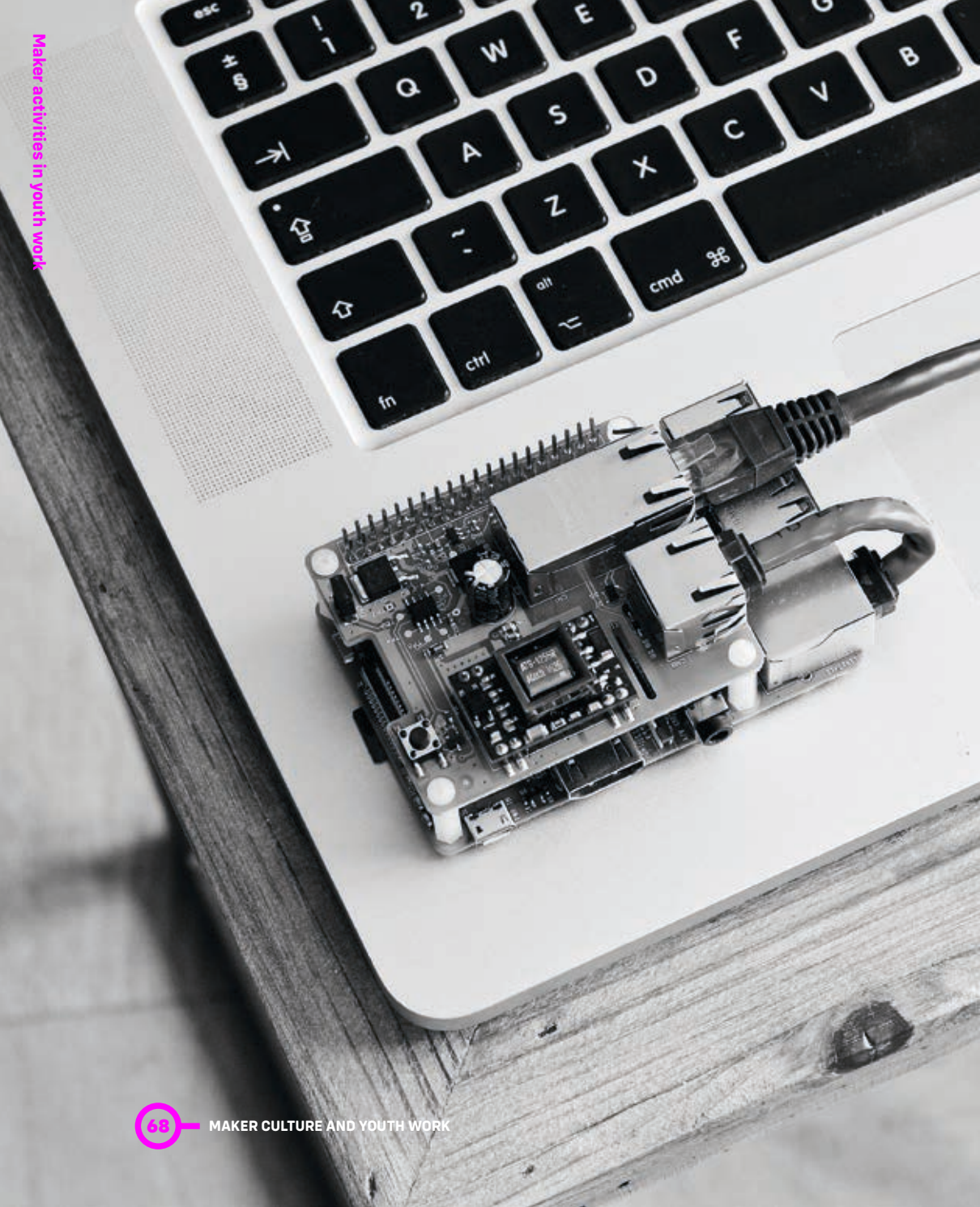
The growth of digital youth work in Ireland has been greatly influenced by the international Clubhouse Network developed by Mitch Resnick's Lifelong Kindergarten Research Group at MIT Media Lab and the Boston Museum of Science in 1993. The Clubhouse's 'learn by designing' pedagogical approach is inspired by two important theories of learning and education: Piaget's constructivism and Papert's constructionism (Resnick). The approach utilises new technologies to promote new types of learning experiences, engaging young people who have often been alienated by traditional educational approaches. This approach is entirely consistent with the Irish youth work sector's principles (Devlin, 2017).

LEARNING BY DESIGNING

The learning by designing (Computer clubhouse 2016) methodology is used by TechSpace to train youth workers to facilitate STEAM activities. Young people learn to design, create, experiment, explore, inquire and solve problems through technology and project-based learning. The content areas are: 1) circuitry and electronics, 2) paper crafts, 3) microcontrollers and robotics, 4) 3D design and printing, 5) coding.

Papert's approach is grounded in social justice and equity. He also believed that if young people were to engage with powerful ideas and construct knowledge, then they would require agency over the learning process and ownership of the technology used to construct knowledge (Stager, 2017). In the 'maker process', a youth worker's role is to become a master inquirer, to model curiosity and to engage a young person through a 'tinkering mindset' (Semper, 2015).

The learn by designing methodology has synergies with the two social education frameworks: youth work as process and product, and knowledge, feeling, skills as elements of a problem (Smith, 1980). The 'maker process' defined by the Clubhouse Network's 'Start Making!' programme (Remold, 2015) outlines a six-stage process to support youth workers to facilitate STEAM projects with young people. By the end of the first four stages (con-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nect, play, build, remix) the young people have produced a prototype of their 'products'. The fifth and six stages (open make, and show and share) are critical steps to deepen Kolb's experiential learning cycle, what Dewey calls the 'transaction' in experience (Ord, 2012). In the open make and show and share sessions, the new knowledge, feelings and skills developed from each of the earlier stages are applied by young people to improve the project they are working on before showcasing and sharing it with their peers.

IN PRACTICE: NYCI TECHSPACE STEAM IN YOUTH WORK MAKER PROJECT

The STEAM in Youth Work Maker project is building the capacity of the Irish youth sector to engage in the global Maker movement and to deliver STEAM (science, technology, engineering, art and maths) education projects across Ireland. Internationally, this is one of a small number of projects that is capacity-building the youth work sector, on a wide, national scale, to deliver STEAM education (see also Curiosity 2017).

Participants initially take part in an introductory training day during which they undertake a range of STEAM and Maker activities and gain the skills and knowledge that they need to facilitate high-quality STEAM learning experiences with young people. They learn the logistics and pedagogy of the 'maker process' (Remold, 2015); how to solder; use a Makey Makey to turn an everyday object, such as a bunch of flowers, into a computer keyboard; make simple circuits; make scribble bots; and make their own speakers.

Following the one-day training, they receive a grant to buy the equipment they need to facilitate STEAM and Maker activities for your young people. They also have access to follow-up support, resources and an online community of practice, so that they can continue to develop their confidence and expertise as they go on to deliver STEAM and Maker activities with young people. The young people they work with have the opportunity to showcase their creations at the amazing annual Creative Tech Fest.

Challenges faced

As a pioneering project, and one of only a few we have come across internationally, the project team has been learning by and through experience as

they design, deliver, adapt and modify the programme to ensure maximum engagement and impact in the youth work sector.

One of the main challenges encountered relates to the 'resistant mindsets', identified in Screenagers (NYCI, 2016), among parts of the youth sector to the involvement of youth workers in STEAM education. During our first year, we engaged the early adopters, but some did not get the organisational support to embed what they had learned within their practice and to continue to develop and deliver STEAM projects. Other youth workers did not see the relevance of STEAM to youth work. As a result, much of our effort has focused on awareness-raising through engagement with sector leaders to highlight how STEAM and Maker can be used within youth work to enhance youth work outcomes. In our second year, instead of filling our trainings through open-calls, we 'pitched' it to managers to commission on behalf of their colleagues as continuous professional development opportunities. This approach is proving to be more effective in embedding STEAM as a methodology within youth work.

Another key challenge relates to the inquiry-based and constructionist learning model that our project is based on, and which is central to effective STEAM and Maker education. There is a certain degree of discomfort for some youth workers in taking a step back, in limiting instruction, in taking on a more nuanced facilitation role, and in allowing young people to make, experiment, explore, encounter problems and solve them (almost 20% of those we train in some way struggle with this). Supporting youth workers through this discomfort is an ongoing area of learning for us and the focus of much of our upcoming activity.

IN PRACTICE: NUI CERTIFICATE IN DIGITAL CREATIVITY IN YOUTH SETTINGS

Dynamic working relationships across sectors continue to be central to developments in establishing STEAM in Irish youth work. The Department of Applied Social Studies [DAPPSS] at Maynooth University is the longest established provider of professional youth work education and training in the Republic of Ireland and has partnered very effectively with the youth sector to develop special purpose accredited programmes that respond to emerging practice needs.

Collaborating with Camara Education Ireland/Techspace, the Centre for Youth Research and Development [CYRD] at the DAPPSS designed a ground-breaking certificate programme, 'NUI Certificate in Digital Creativity in Youth Work', which was launched in 2018. The programme is unique in Europe and responds to the continuous professional and practice development needs of the non-formal education sector by enabling youth workers and educators to develop specialist skills and knowledge in digital youth work. (Techspace 2017) It is certified at Level 8 on the Irish National Qualification Framework [NQF] and carries 20 ECTS credits across 100 hours of tuition, along with substantial self-directed work which includes designing and implementing a digital project with young people. The students learn to use technology as a tool for digital creativity so that it can be extended to young people themselves, empowering them to be creators.

The curriculum is underpinned by an educational philosophy that promotes non-formal, experiential learning central to good youth work practice. This will include the deployment of a framework to strategically integrate educational technology in youth organisations supported by an established pedagogical approach to digital creativity in youth work. Students develop competencies to confidently and effectively use the key theories, frameworks, models, approaches, and tools to ignite creative confidence in young people through digital and STEAM programmes.

INITIAL FINDINGS

The first cohort of students are passionate, innovative non-formal educators from across Ireland. They come from an exciting mix of backgrounds: from youth theatre, vocational education, national youth work organisations, a start-up STEAM education business for schools, and youth workers working through the medium of the Irish language.

Through the programme, the students have grown into an inter-agency, supportive community of digital youth work practitioners. In October 2018, a student showcase event took place with students' exhibiting a range of projects that blended digital and STEAM: from VR to 3D fabrication to puppetry animation. An in-depth programme evaluation is currently underway.

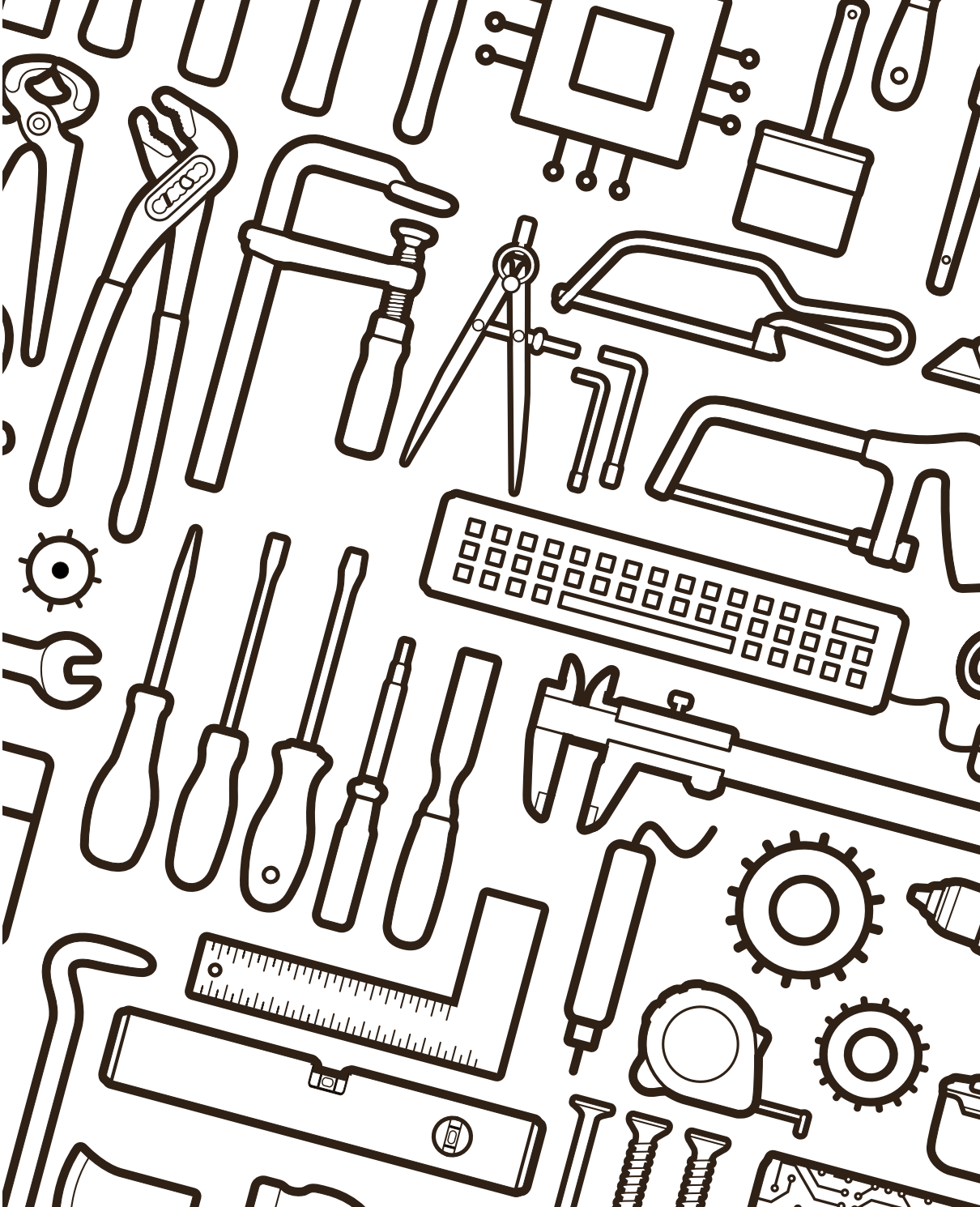
CONCLUSION

The emergence of 'digital youth work', STEAM and Maker education as youth work methodologies within Ireland has been instigated by the youth work sector itself. While the government has acknowledged the benefit of informal STEAM learning, as of yet, no policies have been implemented through which the government formally supports the youth work sector's role in this area.

A substantial two-year grant received from the Science Foundation of Ireland to a youth work sector-led STEAM education initiative has been an important acknowledgment of the exploratory work the sector has been doing since 2012. This grant has also had considerable impact on the youth sectors' wide-scale ability to innovate in using STEAM and Maker education within youth work. Complimentary sector-led initiatives such as the NUI Certificate in Digital Creativity in Youth Settings are resulting in specialist expertise being developed by innovators in the field. There is now widespread awareness among the Irish youth work sector of the considerable potential STEAM and Maker education has to support youth work outcomes. We are now at a point where our evidence base around best practice in the area of STEAM and Maker education is emerging and we are developing a clearer picture of exactly how it contributes to youth work outcomes. We anticipate that the future of this area of youth work will continue to grow and, over the coming years, as the momentum builds, we hope that:

- STEAM will be embedded as a robust, evidenced-based tool within youth work methodologies with supporting infrastructure
- STEAM as a youth work methodology is mainstreamed within youth work professional education programmes and continuous professional development programmes for youth workers.
- Ireland's youth sector will become a leader in the use of STEAM and Maker education within youth work internationally.
- Ireland's youth work sector will become an established part of the broader STEAM education ecosystem, fully recognised within relevant central government department policies.

One of the things that we have going for us as we seek to turn those hopes into reality is the effective creative partnership between key youth sector organisations, specialist digital training providers and higher education institutions. These are early days – exciting days – as we take the first steps towards embedding STEAM in Irish youth work.



MAKER ACTIVITIES IN YOUTH WORK

WHAT IS THE SIGNIFICANCE of the maker movement for youth work? What do maker culture and youth work have in common? What is the added value of maker activities for established youth work practice? How does one get started?

The maker movement has brought forth DIY culture once more. Although youth work has a long-standing tradition in both supporting young people's practical know-how and developing digital youth work, adapting 21st-century craftsmanship to youth work curriculum hasn't always been easy. It is clear, however, that the youth work field must adopt maker methods as a permanent part of youth work methodology to keep up with technological progress. The articles in this publication seek to explore the possibilities of maker activities in youth work from the viewpoints of digitalisation of society, maker culture as well as practical youth work activities.

This book is intended for anyone interested in digital youth work and maker activities. We hope that it will aid readers in understanding the phenomena behind practical maker activities while giving new viewpoints and tips for youth work practice. Most of all we aim to inspire readers to explore the possibilities of maker activities in practical youth work.

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