

Supporting Parents to Navigate the Modern Digital Ecosystem

A research project on parental attitudes to STEM and digital technologies

Parents have a profound impact on children's learning, interests and educational/career outcomes. This article describes our community action research project at National College of Ireland, which we are conducting with parents in Dublin's north inner city. It explores their attitudes to and awareness of STEM, to discover how best to support parents in keeping their children safe, engaged, and learning in the modern digital ecosystem.

Introduction

Over the past 10 years, National College of Ireland (NCI), with support from Science Foundation Ireland, has enabled 3,000 children annually to access Science, Technology, Engineering, and Mathematics (STEM) education, develop digital skills, and build positive STEM identities. Over 20,000 parents have engaged, with 94% satisfaction rates. We are now exploring how to develop parenting support programmes focused on building parents' capacity to navigate the modern digital ecosystem for themselves and their children.

Early learning is a child's foundation for all future learning (Heckman, 2006). Early learning and ability in STEM is a strong predictor of future success, both academically and in a range of careers, including future careers in areas such as artificial intelligence (AI) (Hinjosa et al., 2016). Parents play a critical role in motivating children to learn STEM. Parents' knowledge, skills, attitudes, and behaviours can increase their child's motivation and self-efficacy in areas that are often perceived as intimidating at first (Bandura, 1997).

However, parents in disadvantaged communities often do not have the knowledge or skills in STEM to encourage children in these areas (Early Learning Initiative, 2012). Dublin's north inner city is one of Ireland's most



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disadvantaged communities, impacted by educational inequality, inter-generational poverty, homelessness, addiction, crime, early school leaving, and immigration. To improve access to early learning in STEM in this community, NCI has offered a range of programmes since 2008 (Darmody et al., 2022; Darmody et al., 2023; Alcalá et al., 2024).

Given parents' critical role, and the speed at which STEM is changing, there is a need to better understand parental attitudes to and awareness of STEM so that we can bring them in to help design programmes. This approach, called community action research, involves the community in decisions, design, and conducting of research, and has been used by NCI to develop grassroots STEM family learning programmes (Bleach, 2013; Bleach & Stynes, 2024). However, more evidence-based clarity was needed on how parents in this community think and feel about STEM.

Interview questions were developed based on the parent socialisation model (Eccles et al., 1983), according to which parents' beliefs and values influence parenting behaviours, which in turn influence children's competence and beliefs.

This article will describe our new research project, *Participatory research on parental attitudes and awareness of STEM and digital technologies*, and present initial findings. The project aims to better understand parents' perceptions of STEM in Dublin's inner city, identify barriers to their engagement with STEM, and inform NCI programmatic development. It is hoped this research will help us design new and more effective programmes and increase parents' engagement, skills, and knowledge in STEM, thus influencing early learning in these areas.

The research

The research is a collaboration between NCI's Early Learning Initiative (ELI), School of Computing, and School of Business. We aim to conduct 10 semi-structured interviews with parents based in Dublin's north inner city. Interview questions were developed based on the parent socialisation model (Eccles et al., 1983). According to this model, parents' beliefs and values influence parenting behaviours, which in turn influence children's competence and beliefs.

We conducted three pilot interviews, whose transcripts were analysed using thematic analysis (Braun & Clarke, 2006), which revealed several themes. When they hear the term 'STEM', multiple parents reported a feeling of fear, linked to being bad at maths. Similarly, when asked what they know about digital technology, there was a perception of not being good at it, despite reporting everyday use.

Parents see a balance of positive and negative results of technology: they acknowledge how it helps with everyday tasks, but are aware it can take time from more face-to-face interaction with family and friends. They know how important early learning of STEM in school is, and that schools should start

STEM education earlier but are under-resourced. Finally, parents need more information on AI, and simplification, but they tend to think it is mostly positive for children and those with additional needs.

Discussion

The pilot interview themes are consistent with previous surveys by National College of Ireland, which highlighted that parents had high aspirations for their children's education but were not confident they had the skills to support it (Dartington Social Research Unit, 2006). As such, there is a clear rationale for our STEM family learning programmes, and for adding new programmes designed to engage parents of young children in STEM and digital technologies.

We are now looking forward to the results of the full research project. This includes our survey on parental attitudes to and awareness of STEM, which we hope to distribute to 200 parents, and the results of a further 10 semi-structured interviews. We aim to complete the project by late 2024 and to use this research to inform new programmes soon after.

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Howard Foundation extends support of Chair in Human Nutrition at SETU



Pictured at the Nutrition Research Centre Ireland at SETU's West Campus: (L-R) Jonathan Howard, Professor John Nolan, Julie Lambert.

The Howard Foundation has extended its support of Professor John Nolan at South East Technological University (SETU) as Howard Chair until 2031, allowing him to continue to expand into new frontiers of research for the benefit of society.

Over the last two decades, Professor John Nolan has led research on the study of nutrients for human health and function. This work, conducted at the Nutrition Research Centre Ireland (NRCI) at SETU, has had significant impact for science and society.

Professor Nolan and the late Dr Alan Howard, founder of the Howard Foundation, an English charity, collaborated on many scientific projects leading to seminal research publications, patented scientific discoveries, and setting up an international conference for scientists in the field (see www.bonconference.org). Their main area of study identified how certain nutritional supplements improve quality of life for patients with age-related macular degeneration and Alzheimer's disease.

Empowered by the support of the Howard Chair's funding, Professor Nolan has been able to develop the Research Centre to a level that is renowned and connected worldwide. Researchers at the centre continue to identify new technologies and strategies using nutritional bioactives known as carotenoids (the coloured pigments found in fruits and vegetables) and co-nutrients (e.g. omega-3 fatty acids, from fish and algae) to support human health.