

**Project Proposal Application**

To be completed by the lead proposed supervisor,  
with input from the non-HE Partner Organisation(s).



Arts and  
Humanities  
Research Council

SECTION 1: PROJECT SUMMARY AND APPLICANT DETAILS			
<b>Proposed Project Title:</b>	Creative Play: Learning to Fail through Digital Tinkering		
<b>Project Summary:</b> <i>(Maximum 100 words)</i>	Thinking creatively and managing setbacks are crucial for all young people. Playful digital tinkering in family groups can help develop creativity and build resilience by reducing fear of failure. However, play can unintentionally exclude families from disadvantaged backgrounds, and we need more evidence of how to support children to learn from their mistakes. In collaboration with the International Centre for Life, a science visitor centre in Newcastle, the research will explore how to maximise inclusivity in playful design, how best to facilitate learning through failure, and provide evidence of the impacts of this approach on fear of failure and creativity.		
<b>Host University:</b>	Northumbria University		
<b>Name of Non-HE Partner Organisation(s):</b> <i>(Add more lines if needed)</i>			
1. International Centre for Life (Life), Newcastle-upon-Tyne			
2.			
<b>Contact(s) at Non-HE Partner Organisation(s):</b> <i>(Add more lines if needed)</i>			
Name:	Andy Lloyd, Head of Development and Partnerships	Email:	andy.lloyd@life.org.uk
Name:		Email:	
<b>Primary AHRC Subject Area:</b> <i>Select one subject area from the list here. Do not add or amend subjects - there will not be a corresponding Subject Area panel to assess the application.</i>	Information and Communication Technologies		
Does the project include a Creative Practice component?	YES <input type="checkbox"/>	NO <input checked="" type="checkbox"/>	
Do you consider the project to be interdisciplinary?	YES <input checked="" type="checkbox"/>	NO <input type="checkbox"/>	
<b>If you consider the project to be interdisciplinary, please state why:</b> <i>(Maximum 100 words. Note, all applications will be assessed by the appropriate primary subject area cross-institutional panel.)</i>			
This project spans many disciplinary areas; while the primary focus is on creativity and digital play, it also draws on science communication, intergenerational pedagogy, problem-based and collaborative education, and the psychology of failure.			

## SECTION 2: PROJECT PROPOSAL AND CASE FOR SUPPORT

Please provide full details of the proposal and make your case for support below:

*(Maximum 750 words)*

Thinking innovatively and managing setbacks are crucial skills for young people to thrive in an increasingly uncertain world (Cobo, 2012; Masten, 2013). Learning without fear of failure is key and play allows the creation of safe spaces in which mistake making is an integral part of a creative process (Toft Nørgård et al., 2017).

Play is increasingly used in public engagement to create safe spaces for experimentation, tinkering, and learning from failure. However, playful experiences may unintentionally exclude people from different cultural backgrounds, with less social or financial capital, less experience of play, less confidence, and different levels of ability, including disabilities. This is an underexplored unintended consequence of play, and we need more evidence of how play design effects inclusivity (Whitton, 2022).

The International Centre for Life (**Life**) is a Newcastle-based science visitor centre that applies lessons from the Humanities and Social Science to engage the public with STEM areas through creative activities, including intergenerational play, problem-solving and digital tinkering. The Connect project, for example, was a partnership between **Life** and NUSTEM (Northumbria University STEM engagement) that developed a workshop model for exploring digital technologies through digital making in family groups.

Intergenerational digital play builds relationships, enhances reciprocal learning, increases intergenerational understanding, and reduces anxiety (De La Hera, et al., 2017); digital tinkering supports learning through engagement, develops initiative, and increases understanding (Gutwill et al., 2015); and collaborative problem-solving develops teamwork and communication skills (Allan et al., 2011). Playful problem-solving and digital tinkering develops creativity and builds resilience by reducing fear of failure (Vossough & Bevan, 2014). More work is needed to identify how adults can support children to learn from their mistakes, and to evidence the relationships between play, creativity, and fear of failure.

Visitors to **Life** come from a wide range of social backgrounds, with different abilities, experiences, confidence, and exposure to play. Individuals from disadvantaged contexts may benefit less from play and have greater fear of failure than those who are more privileged. This project will explore ways to address this imbalance and enable those people who need it most to benefit from play.

The research will explore improved inclusivity in play design, how best to facilitate learning through failure, and the degree to which engaging in family play experiences can reduce fear of failure (using Choi's (2021) model of fear of failure comprising performance avoidance, shame, self-handicapping, and helplessness) and build creativity (using Lucas' (2016) five-dimensional model of creative habits of mind: imaginative, inquisitive, disciplined, persistent and collaborative).

RQ1. How can playful design be used to maximise inclusivity in intergenerational digital tinkering experiences?

RQ2. How can parents best model and enable inclusive and positive experiences to support learning from failure?

RQ3. What are the outcomes of participation in intergenerational play for children in relation to fear of failure and creativity?

The research will build on the existing work of **Life** to provide an evidence-base to underpin the growing use of play. It will explore, refine, and evaluate the use of playful approaches (using the tools, techniques, and tactics of playful learning, Whitton, 2018) to enhance the design of intergenerational tinkering experiences for family groups with children in Years 5/6 of primary school (aged 9-11) who will be recruited both through **Life** and through NUSTEM. At this age fear of failure becomes more apparent as school curricula intensify and national testing takes place. Playful interventions at this stage can make a significant impact as students prepare for secondary school.

The project will use a mixed-methods participatory-design approach. The first two research questions will be addressed by gathering family interviews and observational data of play workshops to explore types of, and reasons for, exclusion in play. This will inform the iterative design of a series of inclusive playful digital tinkering experiences; during prototyping, data will be collected through observation and focus groups with participants. Finally, a series of workshops will be created, in which both qualitative and quantitative data will be gathered on fear of failure and creativity to evidence impact on participant families.

As well as the intrinsic value of this doctoral research, it will inform the design of future activities and experiences at **Life**, applying the results of the research to the design of exhibitions, the structure and scripting of programmes, and to improve the training of

public-facing staff. In addition, the study will promote the importance of learning through failure to parents and support the most effective use of play and digital tinkering across the sector.

**Provide details of any resources and facilities, including equipment, fieldwork, training, etc., that will be required to complete the project successfully. NBC has limited Research Training Support Grant funding, which may affect the feasibility of high-cost projects. Please note where you might also secure additional funding, (e.g. partner organisations; department or school). Include estimated costs:**

*(Maximum 200 words)*

Working space, IT equipment, and access to a full range of researcher development training and opportunities will be provided by Northumbria University (School of Computing and Information Sciences). NUSTEM and Life will provide training on working with children and family groups and facilitating tinkering.

Life's "Making Studios" facility is a multi-purpose workshop space for public use, equipped with a range of digital making equipment suitable for adults and children. It can also serve as a controlled environment for subject observation during the research phase. Life will provide desk space in the Making Studio one day per week and make the space and equipment (electronic components, sensors, crafting materials, and computing hardware) available to run workshops and data gathering activities. NUSTEM will also provide access to its store of equipment.

Additional making resources will be required to run family workshops (approximately £30 per family for up to 50 family groups throughout the project = £1,500). In addition, we estimate £1,000 for prototyping kit, and £1,000 for transcription costs and incentives.

**Outline the arrangements for communication between the non-HE partner organisation and the academic host institution in regard to project management and monitoring academic progress:**

*(Maximum 200 words)*

Communication will be facilitated through a shared Teams site, to which all supervisors and advisors will be invited. This will be used for commenting on writing/chapter drafts, sharing data (as appropriate), notes of supervisory meetings, and ad hoc communication.

The advisor from the Life Science Centre will be invited to attend supervisory meetings as appropriate, with the expectation of attendance four times a year.

The advisors will be invited to attend all formal progress review meetings.

During the design/data collection phase of the project, the student will be located in the Life Science Centre for one day a week and have regular meetings with the advisor as appropriate.

**What benefits will there be for the candidate and the non-HE partner organisation as a result of your collaboration?**

*(Maximum 300 words)*

The candidate will have access to a high-quality maker space, digital tinkering kit, and expertise in designing digital tinkering workshops in the Life Science Centre. Both Life and NUSTEM have established relationships with community groups that are traditionally under-represented in STEM engagement and cultural activities and have the ability to engage family groups from a wide range of social backgrounds (including families already engaged with the centre and those recruited in addition from less established demographic groups). The candidate will also learn from the extensive experience in participatory design and the ethics of working with family groups and ensuring fully informed consent from all participants. The project will also necessitate engagement with a wide range of research methodologies and experience in an inter-disciplinary environment.

The partner organisation will benefit from evidenced guidance in best practice in design of play-based workshops that are inclusive, guidance on ways in which parents can support their children to learn through failure and how best to communicate this to parents. The project will allow them to expand their activities in the digital making space by making materials and workshop plans available after the end of the project, enabling them to take a lead on future play-based engagement. It would also put Life in an excellent position to build capacity in the longer term and apply for further funding in the area. Specific learning around modelling and communicating failure, and positive responses to failure, will be applicable to future programmes and exhibitions.

**State what financial (if any) or in-kind contribution the non-HE partner organisation will be making over the duration of the award:**

*(Maximum 100 words. A financial contribution is **not** a requirement. However, the AHRC expect that **non-HE partners based overseas** will make a financial contribution to the costs of the student's return travel and accommodation when visiting.)*

**Life** will provide working space for the student in the centre for up to one day a week, access to the maker spaces and equipment. They will be integrated into the in-house engagement team, treated as an honorary staff member (with email account and access pass) and undergo a full DBS security check at **Life's** expense.

**Life** will provide bespoke training in designing and running digital maker experiences, and support dissemination to professional/practitioner networks through publications and conferences. The in-kind contribution will be approximately £10k in staff time, £5k in training and £10k in facilities and venue costs.

**Describe the nature of the collaborative arrangement and the activities the candidate will be undertaking with the non-HE partner organisation:**

*(Maximum 300 words)*

During the first phase of the project, the Life Centre will support the student to:

- undertake interviews with a broad spectrum of users of the Life Centre, including groups of users with specific characteristics (e.g. autistic user group) as appropriate;
- carry out observations of families in intergenerational workshops.

During the second phase of the project, the Life Centre will support the student to:

- design high-quality workshops/experiences, building on existing expertise;
- iteratively develop and evaluate one or more playful family experiences, providing promotion to family groups and helping communicate the value of research;
- meet the Northumbria University ethical requirements and **Life** policies for working with disadvantaged children and families (of which **Life** have extensive experience).

During the final phase of the project, the Life Centre will support the student to:

- run a programme of workshops/playful experiences for families (we envisage around twenty families taking part in this part of the project which is sufficient for data collection and realistic for recruitment);
- gather pre- and post-workshop/experience quantitative and qualitative data.

### SECTION 3: SUPERVISION AND EXTERNAL ADVISORS

**Primary (or Co-) Supervisor:** Professor Nic Whitton

School or Department:	Computing and Information Sciences	Email Address:	nic.whitton@northumbria.ac.uk
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**Secondary (or Co-) Supervisor:** Dr Rebecca Nicholson

School or Department:	Computing and Information Sciences	Email Address:	rebecca.nicholson@northumbria.ac.uk
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**Name of the Advisor based at the Non-HE Partner Organisation:** Andy Lloyd

Organisation/Institution:	Life Science Centre	Email Address:	andy.lloyd@life.org.uk
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Organisation/Institution:		Email Address:	
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**Name of Additional Internal or External Advisors or Academic Supervisors, if any:** Jonathan Sanderson

Organisation/Institution:	NUSTEM, Northumbria University	Email Address:	jonathan.sanderson@northumbria.ac.uk
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**Explain how the expertise of the supervisory team and external advisor(s) will allow them to support the proposed project and the selected candidate:**

*(Maximum 500 words)*

Nicola Whitton (<https://researchportal.northumbria.ac.uk/en/persons/nic-whitton>) is Professor of Digital Learning and Play in Computing and Information Sciences at Northumbria University and has published widely on the value of play, experience design, educational games, digital game-making, and playful learning. She also has expertise in inclusive learning design and her work spans both informational and computational science and education (she is an Honorary Professor of Education at Durham University). She is an experienced doctoral supervisor with nine successful completions (four as Director of Studies) and conducted over twenty examinations. She is a mixed-methods researcher experienced using both qualitative and quantitative research approaches.

Rebecca Nicholson (<https://researchportal.northumbria.ac.uk/en/persons/rebecca-nicholson>) is a Lecturer in Computer and Information Sciences at Northumbria University with expertise in the design and development of educational technologies. Her work uses co-design and arts-based methods to design and evaluate digital technologies that support 'risky' pedagogies, particularly those involving authentic learning, digital making, and tangible computing. She is a qualified teacher having taught Performing Arts prior to becoming a lecturer and has extensive experience designing and running participatory workshops particularly with children and young people.

Andy Lloyd (<https://www.linkedin.com/in/andyllloyd/>) is Head of Development and Partnerships at the Life Science Centre and has nearly 30 years' experience in informal science learning. He has led the development of multiple interactive exhibitions and learning facilities, including the family laboratory and maker spaces at Life. He has partnered with academics at Durham University, Kings College London, Bristol University, UCL Institute of Education and the University of Oregon on research projects investigating public engagement with science in informal settings. He has expertise in learning, interaction design, project design and visitor behaviour. He has co-supervised a PhD in Anthropology (cumulative culture in Museum settings) and designed and taught on science communication master's programmes. He will facilitate engagement with the wider Life team, offer guidance on audiences and facilitate access to participants in the science centre.

Jonathan Sanderson (<https://researchportal.northumbria.ac.uk/en/persons/jonathan-sanderson>) is an Assistant Professor in the Department of Computer and Information Sciences at Northumbria University. As a member of the NUSTEM research and outreach group he led on the Connect family digital tinkering project, developing approaches to integrating a coding element into craft and mechanism-based workshop experiences. His work explores how problem definition, materials provision, and programming environment intersect to prompt discussions within participant groups. Previously, he ran a successful science communication consultancy, working nationally and internationally with clients including NESTA, The Royal Institution, the British Council, the National Coordinating Centre for Public Engagement and Abu Dhabi Science Festival. His early career included a decade as a producer of science and engineering television series, often for children's and family audiences.

#### **SECTION 4: RESEARCH ENVIRONMENT**

**Please provide details about the research environment the selected candidate will be joining and its suitability:**

*(Maximum 500 words)*

The student will be hosted by Computing and Information Sciences at Northumbria University, which provides a vibrant and inclusive research community of 40-50 PGR students, ECRs and established researchers. This will enable them to engage with a wide research community, learn from others at all career stages, and be exposed to different perspectives and ideas. The department hosts regular events that bring researchers together, including formal meetings, training sessions and seminars, and informal get-togethers and social events.

A thriving research student community exists in the newly-built state-of-the-art CIS building, for sharing ideas and supporting the research journey, with opportunities encouraged such as presenting research at the faculty's postgraduate student conference and engaging in student societies. In Computing and Information Sciences we aim to provide a supportive and inclusive research environment, fostering inter-disciplinary connections between staff and PGRs, with an open-door policy and on-campus expectations removing barriers.

The department hosts five research groupings that PGRs are encouraged to engage with, ensuring they are fully embedded in the research culture of the department. The Digital Learning Laboratory (DLL) research group explores the relationship between digital technologies and learning in its widest sense. This group meets regularly to share ideas, collaborate on writing, and provide informal training for each other. Relevant areas of research carried out by the group include digital play and video games for learning (Whitton), the potential of digital tinkering in education (Nicholson), and the use of educational games in STEM education (Sanderson, Strachan). The Northumbria Computing Social Research group will also be relevant to this work and provides another community in which the student can engage.

In addition, we have links with other parts of the university that may be relevant, including the School of Design and the School of Education; the culture of the university is such that cross-disciplinary sharing and collaboration is valued and encouraged. The student would also be expected to engage with the wider institutional research culture through central researcher development activities and a wide suite of institutional training and support resources.

The student would also benefit from the **Life** interdisciplinary research community and sector links. The centre has hosted researchers from several universities to conduct fieldwork with the visiting public as well as collaborating directly with academic research projects. Publications resulting from this work include a study of how pre-school children understand in-group and out-of-group identities (York Dept of Psychology), participatory action research using exhibits as a model for cumulative culture (Durham Dept of Anthropology), and correlating science centre use with adult science literacy (international collaboration, led by University of Oregon). Senior engagement team members collaborate with academic researchers across the UK and overseas, participating in joint projects, sitting on advisory panels and reviewing grant applications. We have co-supervised two embedded PhDs and have hosted multiple masters and doctoral level placement students. These activities contribute to a positive research culture which would support and nurture the professional development of the CDA student.

## SECTION 5: RECRUITMENT INFORMATION

In the event that your project is successful it will be advertised on the Northern Bridge Consortium website to aid recruitment: <http://www.northernbridge.ac.uk/applyforstudentship/cda/>

Please therefore complete the following Applicant Criteria so that advertising can begin immediately following the outcome of the competition:

<i>For further information about this Collaborative Doctoral Award and to submit an Expression of Interest, please contact:</i>	
<b>Lead Supervisor (or Alternative Contact):</b>	Professor Nicola Whitton
<b>Email:</b>	nic.whitton@northumbria.ac.uk
<b>Expressions of Interest must be received no later than:</b>	26 Jan 2024
<b>Expressions of Interest must take the following format:</b>	
<ul style="list-style-type: none"> <li>• A 500-word personal statement;</li> <li>• 2-page CV</li> <li>• 2 academic references.</li> </ul>	
<b>Interviews for shortlisted candidates are expected to take place:</b>	Early Feb 2024

### APPLICANT CRITERIA

*Candidates must also meet the criteria for acceptance on a doctoral programme as set out by the host institution's Postgraduate Admissions Service. The successful candidate will be required to submit a postgraduate application to their host institution following notification that they are to be awarded a conditional CDA studentship, and meet the conditions of the offer of a place on the doctoral programme.*

<b>Education and Professional Qualifications</b>	Essential Criteria	Undergraduate or Masters qualification in informational and computational science and/or education
	Desirable Criteria	
<b>Research and Impact Experience and Training</b>	Essential Criteria	
	Desirable Criteria	Experience of participatory design
<b>Professional Practice and Job-related Experience</b>	Essential Criteria	
	Desirable Criteria	Experience of working with children and young people
<b>Interpersonal Skills</b>	Essential Criteria	
	Desirable Criteria	

<b>Other Factors</b>	Essential Criteria	
	Desirable Criteria	