



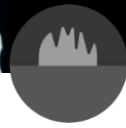
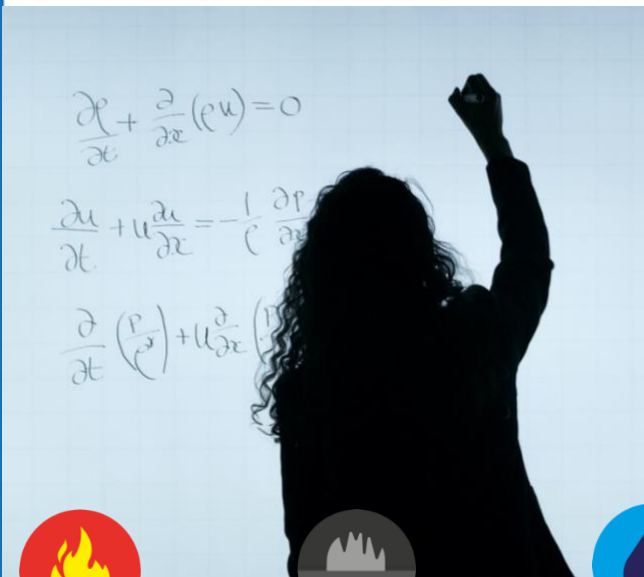
THE UNIVERSITY of EDINBURGH
Moray House School of
Education and Sport



STEM Visionaries: Inspiring Spaces, Inspiring Learning

Activists for Inspiring STEM Learning

Summary Report



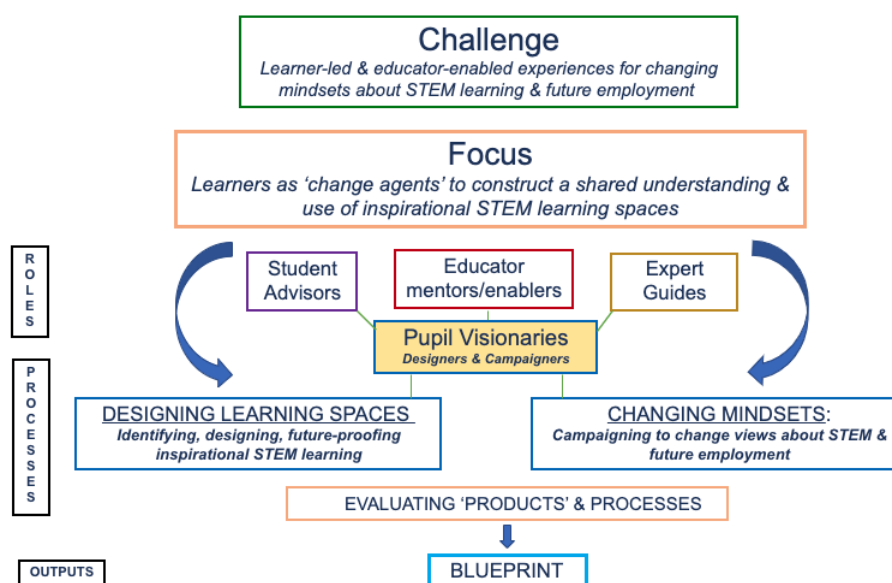
*Celebrating the potential of
a Fife College, St Columba's
RC High School, Woodmill
High School, and University
of Edinburgh collective*

May 2022



The Aims:

- We wanted to create opportunities for young people at different stages of their educational journey to share experiences and take ownership of their learning. To ensure that STEM (Science, Technology, Engineering, and Maths) learning is understood and developed in ways which are inspiring and which will influence their future lives, it is crucial to foreground the voice of learners, teachers, and lecturers.
- The catalyst for the project was the development of the new Dunfermline Learning Campus, that will bring together Fife College and two schools, Woodmill High School and St Columba's RC High School, on one site. With a projected completion date for the 2024-25 academic year, our project offered an important opportunity for the learners themselves to influence the design of the new campus.
- Pupils took on the role of '**STEM Visionaries**', while students from Fife College acted as '**STEM Advisors**', and they were set the task of creating a participant-led blueprint for the STEM spaces. The brief of the blueprint was to demonstrate how working with young people to design their learning will empower and inspire them not only to enhance their achievements but also deepen their understanding of STEM now and in the future. They used a [Shared Learning Space Design Toolkit](#), with symbols representing the conceptual, physical and agile elements of learning space design, as a guide and reference.



- By drawing together the perceptions of different learners and their teachers, we hoped to raise awareness across the Dunfermline Campus communities and promote STEM innovation and learning. Our aim was to build a shared understanding of the ambitions for the Dunfermline Learning campus, and investigate how designed, agile spaces can support inspirational STEM experiences.

- A series of workshops actively encouraged learners to explore different ways of experimenting with STEM spaces including using internet resources such as NUSTEM to garner interest. The use of 3-D modelling through digital gaming such as Minecraft was employed to find alternative ways of ensuring more learners felt included and sought advice and support from local enterprise and professionals.
- We also looked to encourage greater understanding of career pathways from inspirational **STEM Experts** and to capitalise on the expertise and advice of teachers and lecturers as **STEM Mentors** to deepen participant awareness and help raise the aspirations of others. Through this, we hoped to raise awareness of STEM related opportunities for employability and lifelong learning.
- The pupils and students also explored ways in which they could communicate their ideas to a much wider audience in a clear and convincing way, proposing different ways of problem solving through active campaigning.



The Outcomes:

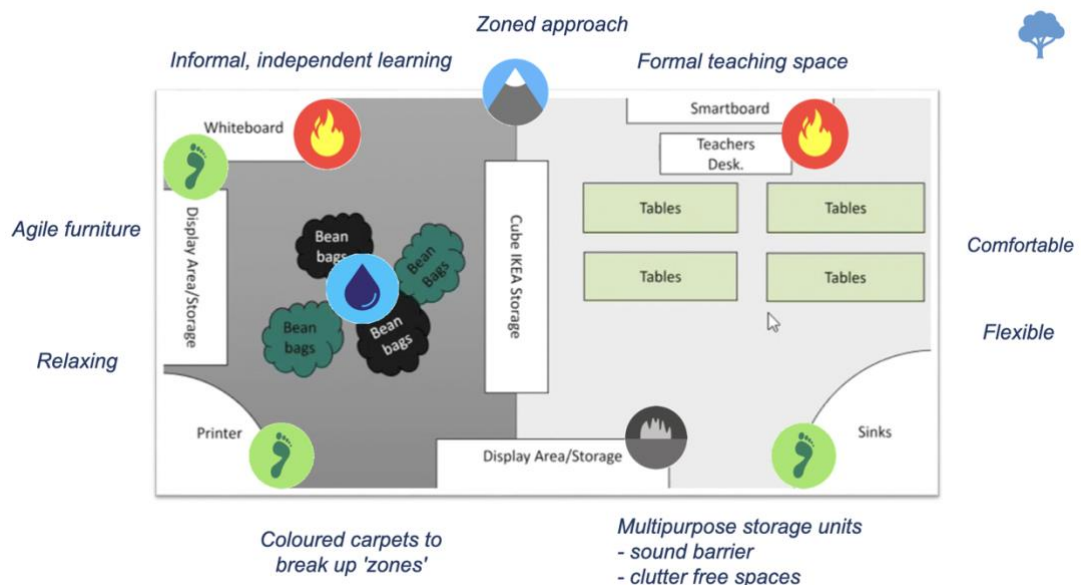
- Responses to 93 participant surveys across the schools and college showed that stereotypes about STEM careers being predominantly for white men remain firmly in place. Female participants from a range of different ages and backgrounds spoke about experiencing discrimination in relation to participating in STEM.
- Both the Visionaries and Advisors expressed that they did not feel there was clear, accessible information or guidance about STEM career paths. However, discussing the different challenges and barriers associated with STEM provided a catalyst for the participants to explore ways to tackle inequalities and influence change.
- Although each of the participants had their own ideas about inspirational learning spaces, common themes emerged from the data: they wanted agile spaces that could change and develop in line with different types of learning. The toolkit helped to develop a shared understanding and 'common language' about learning and learning spaces.
- Many participants talked about how important it was to have spaces for 'teamwork', where they could collaborate and discuss different ideas, but they also called for the introduction of quiet, safe spaces for reflection where they could work independently. Access to the outdoors was also seen as important, and some of the Visionaries spoke

about increasingly integrating nature into their learning spaces; they wanted to explore ways to bring the outside in and the inside out.

- The Visionaries highlighted the importance of having ‘comfortable spaces’ and were aware of how different elements of the design could impact on safety and health and wellbeing. There was a focus on acoustics and noise levels which they felt could impact on concentration and engagement, and a consideration of the need for learning spaces to be inclusive and accessible to all kinds of learners.



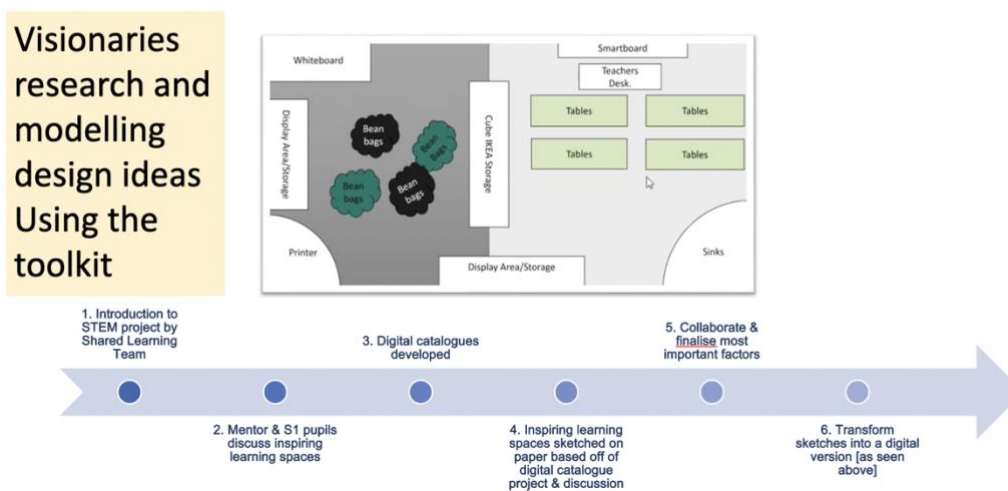
- The Advisors discussed not only the visual and physical elements of any potential design, but also explored the reasons and values that underpinned the designs. For them, it was important to communicate clearly why certain decisions had been arrived at and what further improvements and developments could be made: creating and facilitating inspiring learning spaces was therefore viewed as a continuous process and not a one-off activity.
- The Visionaries wanted to communicate their ideas about STEM and inspiring learning through social media, with a plan to reach other young people across the country and further afield. Instagram was described as the most influential and accessible social media platform for promoting STEM to secondary school pupils. Furthermore, as Instagram ‘influencers’ were seen to be more commonly female, it was seen as potentially a vital tool for helping to increase the female uptake of STEM subjects and careers.
- The Experts and Mentors spoke about developing environments for STEM learning where experimentation was encouraged (by teachers as well as learners), so that learners could take the lead. They talked about fostering a sense of ‘continuous curiosity’ and creativity in combination with the structured thinking associated with STEM, which they felt would keep subjects ‘endlessly fascinating.’



The Impact:

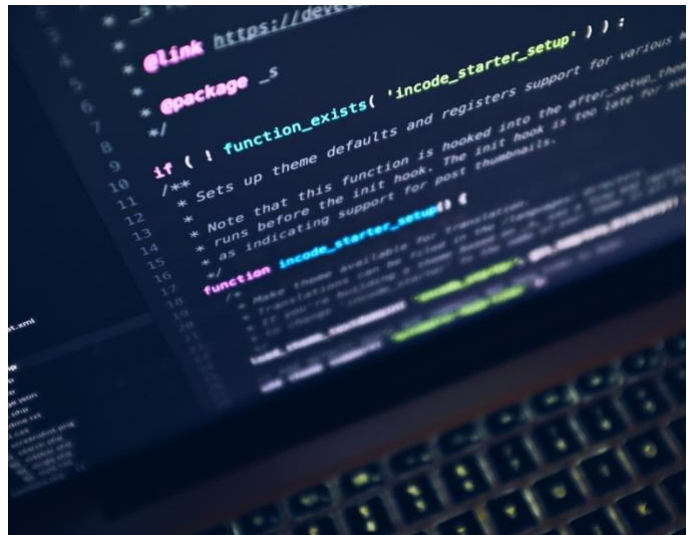
- **Challenges and Stereotypes:** There is still a lack of access to careers in STEM in terms of gender balance, and a lack of transparency about career pathways open to all learners, with evidence suggesting that views like “STEM is for geeks” and that “physics, engineering, and computer science are male-dominated” continue to be common. Visionaries accepted that perceptions need to be changed, through teaching and learning, with more positive messages that *STEM is for everyone*.
- **Skills and Employment:** Learners must have opportunities to experience a greater depth of a particular subject or cross-disciplinary project-based learning before they choose to take it up in S3. Learners need ongoing opportunities in STEM, not just one-off events. The new learning campus itself could be a ‘go to’ Scottish hub for careers and employment advice and opportunities.
- **Inspirational Learning Spaces:** Having a combination of open-plan spaces, classrooms, and places where learners can huddle or learn independently can support different types of learning. More consideration could be given over to designing a STEM learning Lab which, given the strong messages articulated by participants, should not be a replica of a traditional science lab in a classroom. Providing comfortable and agile furniture that can be easily moved to meet the needs of different types of learning activities was communicated, particularly by the Visionaries, as essential. Having more flexibility in the classroom would enable young people to have agency over their learning and in rethinking the environment to support rethinking STEM.

Woodmill Learning Space Process



- **Influencing Change:** The participants felt strongly that what makes STEM inspirational is providing equitable experiences, and creating innovative and exciting futures thinking spaces where everyone has a role and is valued. There needs to be consistency and momentum in promoting STEM to all learners.

- **Learner Voice:** There is a need for further consultation with learners, with many ideas, worries and concerns about the new campus shared during the project. The schools are planning and organising for the architects to come in and gather perspectives from pupils, and this approach should be encouraged at all stages of development.
- **Connections:** Evidence suggests that there needs to be a neutral space within the new campus, away from the classroom, that is designed to encourage conversations and connections between teachers and pupils. Holding a workshop with teachers about designing a space that encourages collaboration would aid with this. The campus will naturally bring together many learners (and teachers) of different ages and stages, and it is important that the potential for connections is realised through the design of the space.
- **Integrating different (learning) cultures:** There are different learning and teaching approaches at school and college, and these differences need to be acknowledged and promoted in the new learning campus. A Learning Lab may offer new opportunities for sharing, learning, and collaborating. Likewise, it is important that different backgrounds, cultures, and experiences are reflected in a holistic way in the new design - learners and teachers should be able to 'see themselves in their environment.'
- **Shared Learning Design:** There is scope for organising more discussion *between* the school pupils and college students, particularly considering the cognitive aspects of design, and exploring the different expectations that learners have about the new campus. Such community-building could involve gathering and working through these different views, to develop the potential to create dynamic and inclusive spaces that inspire all different types of learning, including STEM.



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