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NEWS FROM THE BRITISH EDUCATIONAL RESEARCH ASSOCIATION
The Potential of the ‘A’ in STEAM for Curriculum Development

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The recent BERA report on STEAM (Colucci-Gray et al, 2017) notes that the majority of the STEAM literature tends to be concerned with the pedagogical possibilities of including ‘A’ with STEM. Here we want to focus instead on the curricular possibilities.

We do this for three reasons. Firstly, the arts can often be seen as a handmaiden of STEM education, offering more engaging ways for young people to access challenging scientific content. There seems to be little argument that more creative and enjoyable approaches to teaching and learning are preferable, but we think it worth exploring a deeper, more equal contribution. Secondly, the report notes that the majority of STEAM interventions are short, externally led and supplemental to the main activity of the school.

If STEAM is to become part of the daily life of the school then it will need to address what Bernstein (1977) identified as the three ‘message systems of education’: curriculum, pedagogy and assessment. Whilst pedagogy is important, perhaps more so are curriculum and assessment. Our third reason stems from indications that some practitioners involved in STEAM initiatives are beginning to think about the curricular aspects of their approach. Here we consider one such project, The Imagineerium based in Coventry, as illustration of these issues.

The Imagineerium is a partnership between culture, business and education which works with primary schools. Positioned as ‘Young Imagineers’, pupils are supported to bring together and develop knowledge, skills and abilities from the arts and engineering to respond to a real world commission. This commission, which changes regularly, requires the pupils to design unique, mechanised artefacts which are aesthetically appealing, function in terms of the particular brief, have value for the community of Coventry and require some understanding of engineering. The best of these artefacts are built to full scale and used as part of cultural events and projects. Drawing a little on immersive theatre, pupils work in teams, both as experts in imagining and as apprentice designers. This duality allows for ownership as well as directed skill development. Pupils learn engineering ideas, for example how forces shape structures, through hands-on activities and physical theatre utilising their whole bodies. The Imagineerium team are working to address a number of emerging issues, many of which express ongoing as well as current tensions familiar to educationalists. These include:

- Commitments to STEM, especially engineering education, and broader educational outcomes;
- Commitments to the arts as a site where human sociality, creativity and potential are valued and promoted;
- Constructing an immersive and responsive STEAM project as well as mapping to national curriculum outcomes;
- Focusing on both embodied, physical and active learning; and theorised reflecting and understanding.

Whilst there are a number of potential pedagogical concerns in these issues, the focus of this paper and ongoing work with The Imagineerium is with the curricular implications. Curriculum theory has, Janus-like, to look two ways: towards educational foundations and towards particular educational practices. Young (2013) has recently called for a
return to knowledge as an underpinning foundation of curricula (see Deng, 2016 for a review). We agree with Young that a curriculum founded on knowledge is critical for the development of The Imagineerium (Trowsdale & Davies, 2017). However, we diverge from him in the particular account of knowledge that is helpful to these educational practitioners. The concerns of The Imagineerium are not unique to this project. In reviewing STEAM projects and literature, Colucci-Gray et al (2017) identified that the specific concerns raised by this case study were reflected more broadly. The report collated these types of concerns under three related headings: moving beyond monodisciplinary thinking and working, the knowledge foundations of the curriculum, and how the arts-STEM relationship enables the broader purposes of education.

Ryle’s (1949) distinction between ‘knowing that’ and ‘knowing how’ (and perhaps Reid’s, 1980, ‘knowing this’) offer epistemic foundations for discussions about the purpose and structure of The Imagineerium’s curriculum. The distinctions and their combination articulate both what is valuable in this way of educating pupils and also links into the demands of school policy. These policies require the mapping of pupil progress against hierarchically ordered, discipline-specific, and narrowly defined educational outcomes. The distinctions identified by Ryle and Reid transcend a discipline shaped model of both knowledge and the curriculum, allowing the various disciplinary backgrounds of the arts, engineering and mathematics to be brought together on equal terms: monodisciplinarity is overcome in practice. Further, the distinction allows The Imagineerium to identify that knowledge which is expressed as content and that which is expressed in the practices of pupil-imagineers. In The Imagineerium it is not that content is ‘knowing that’ and process a matter of ‘knowing how’, but that content and practice provide both knowing that and knowing how. Significantly, this analysis of the curriculum directs The Imagineerium because it has a strong sense of its purpose, its equal concern with arts, engineering and the broader educational development of pupils in relation to each other and to their local history and community.

Whilst there is a range of educational foundations which could be marshalled to support curriculum development for educational practices, one usually dominates. The direction of STEAM projects, illustrated here by The Imagineerium, is towards models that do not draw on disciplines, and allow educational projects to articulate their purpose and knowledge structures which equally embrace all relevant knowledge, focussing instead on what is worthwhile for pupils, and why.

REFERENCES