Practical learning in Design & Technology and Art contributes to students' success in a World Class School

King Ecgbert School, Sheffield

www.ecgbert.sheffield.sch.uk

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Students in Years 7 and 10

Headlines

- Growth mindset
- Employability
- Real-world problem solving

About the school

King Ecgbert School (KES) is a large mixed 11–18 secondary school located in Sheffield, South Yorkshire. KES is the founding school in Mercia Learning Trust[1] where it has a system-leading role across the Trust. System leading[2] means that the school shares its expertise by supporting other schools across the Trust and more widely across the region. KES was first accredited in 2017 as a World Class School[3] through the World Class Schools Quality Mark (WCSQM). It was re-accredited in 2021, after being designated World Class School of the Year in 2019. KES also features as a case study in Tom Sherrington's book 'The Learning Forest Fieldbook'.

Making learning whole

KES is proud of its outstanding examination results and students' progress in all areas of the curriculum. The school's aim is to ensure that young people leave the school with much more than great exam results.

> **'Our motivation is to provide a curriculum that ensures the children we educate have real experiences and are instilled with good values.'**[4]

And in his video welcome to KES, Paul Haigh, Headteacher, reinforces this by declaring that:

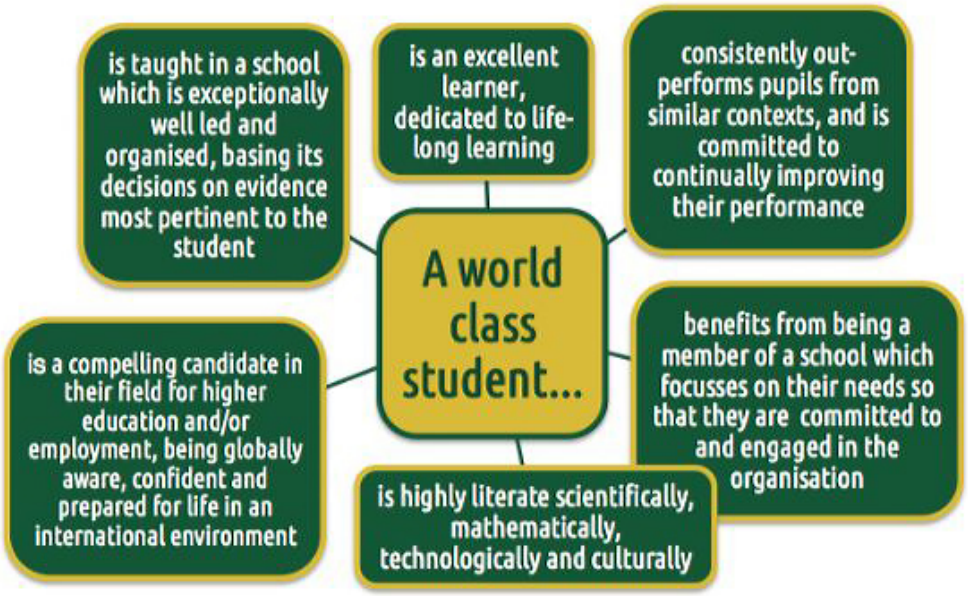
> **'Our aim is that a King Ecgbert education enables our children to do nothing less when they leave than to make the world a better place.'**[5]

The school's engagement with the WCSQM highlights the way its curriculum develops holistic learning to encompass knowledge and students' skills, competencies, character and personal qualities. While Ofsted may measure what the school does to develop these, the WCSQM assesses the extent to which students demonstrate these characteristics[6]. To gain accreditation for the school, students complete an online portfolio of evidence, mapping their skills against the WCSQM's secondary framework and taking part in a face-to-face group challenge. This framework includes six areas covering learning, leadership, achievement, community, the workplace, together with knowledge and understanding of the world. Within those six areas, students demonstrate how they can, for example, work creatively, learn from their mistakes, continually improve their learning, communicate effectively, collaborate with others, and engage in STEM-related issues[7].

Embedding practical learning in the curriculum

At KES, where teaching strategies focus on building secure learning through knowledge retention over time, teachers of design and technology (D&T) and art highlight the benefits for students of developing knowledge through

World Class Schools Quality Mark



practical learning strategies. They are keen to emphasise how theory and practical experience combine, not only to aid learning in these subjects, but also to develop students' skills and character, as identified in the WCSQM secondary framework.

This is one of the reasons underpinning Helen Vardy's aim to increase the amount of integrative STEM-based project work in D&T in Key Stage 3, moving away from the traditional rotation timetable, if possible, in order to have a continuous time period with students across each year. Having achieved this in Years 8 and 9, she would now like to include Year 7. She is keen to resurrect some pre-COVID-19 practices, such as off-timetable days, in collaboration with teachers in science and art.

> **'I do work quite closely with sciences and the arts, and that works really well. We used to have these off-timetable days where we were more collaborative, but they seem to have gone a bit by the wayside. But I would like to look at something, particularly with energy.'** Helen Vardy

The opportunity to have more time with students on projects in Years 8 and 9 over the course of a year is welcomed. It helps teachers build relationships with students and establish classroom routines that support learning.

> **'I've taught my Year 9s now, once a week, every week this year, so I know them all. They're used to the way I work; they know how I've set up my lesson, we have that understanding, and I think the students really respond to that relationship.'** Beth Hastings

If teachers only see students once a week for seven weeks, that trust and the relationship does not build as quickly. That may impact student learning because of safety issues.

> **'I can't quite let them be as independent as I want because of a safety point of view; if I don't know all their names, I can't stop them quickly.'** Beth Hastings

While acknowledging the importance of students having a sound knowledge base for learning, ensuring that knowledge and practical experiences are interconnected is important to develop curiosity, a desire to learn more, and to make students braver.

> **'With all the knowledge-based curriculum, students are terrified of mistakes, that its either right or wrong, I think a change in the language is needed, it's not about wrong and right, it's about refining and it being better.'**
> Helen Vardy

In art lessons, practical learning is about teaching students to be artists, and:

> **'To see the world and view it and use that as a form of communication.'** Sam Cawthorne

Teaching theory and practical in any subject should develop a flexibility of mind that will help students to cope with challenges they may meet in the real world.

> **'Often the reality is something quite different than the knowledge you have, or the thoughts and preconceptions of what you originally thought that might be.'** Sam Cawthorne

Learning for the real world

D&T teachers at KES work hard to dispel outdated perceptions of engineering among students and parents. People from Sheffield, a former steel manufacturing centre, may still hold on to an image of engineering as being about 'shop floor', low-wage, low-skill jobs, rather than being an exciting professional career. Students are introduced to more realistic images of technology and engineering, such as sustainability, by being encouraged to recycle and by focusing on real-world problems in their projects.

> **'I make the kids recycle and we do actually form things out of old milk bottles so that they can see the genuine reuse, constantly thinking about how we can at least be doing one of the six Rs[8] in every project.'**
> Helen Vardy

Solving problems is also about 'the way you bring all your subject knowledge together' (Helen Vardy). Year 7 students are encouraged to combine subject knowledge from D&T and science to solve problems such as designing the ultimate water bottle to avoid using single-use plastics. Students investigate materials and their sources, their life cycles, the idea of durability, and they design a water bottle for particular clients, for example, builders or babies.

> **'It's more sustainable just to fix what you've already got, than to use more resources.'**
> Year 7 student

The D&T department find the resources of STEM Learning[9] invaluable for supporting this new way of thinking about engineering. Helen Vardy has introduced her teaching team to the concept of engineering thinking, or habits of mind (EHoM)[10]. These can help teachers become familiar with new types of engineering. This has been reinforced by inviting engineers to talk to students about their jobs:

> **'I've just done some work with STEM Ambassadors and that was brilliant, actually, getting them into a class, and it did work really well.'**
> Helen Vardy

In a move to reposition D&T away from its craft origins and to emphasise it as vital subject for developing creativity and problem solving, practical learning, in the form of handling materials, is used to develop students' curiosity about the world.

> **'We've been doing a lot more on getting students to actually handle materials and objects, rather than just skills teaching. You've got to develop that curiosity for them to understand the world around them and a lot of it is quite tactile.'**
> Helen Vardy

Handling the material by creating a product helps students to imagine how its qualities might affect its use. They also associate its qualities with the appropriate language for describing concepts such as malleable, hard, soft, flexible, that strengthens their ability to recall the correct terms at a later date.

> **'Having that physical tangible item in their hand helps them understand that language. In a year's time, you could ask, Do you remember that bit of pine and we were scratching into it and we worked out that it wasn't very hard? And they would go, Oh yeah, I remember that.'**
> Beth Hastings

Students have confirmed that using a combination of senses helps their learning.

> **'It helps you learn, and it shows you how it works in more detail, because sometimes with the words you can't really explain it. So when you do it actually in real life, it's just more detailed and much more interesting.'**
> Year 7 student

In art classes, using tools and materials and achieving a high level of dexterity is important for students studying the subject. The thinking processes running concurrently with the physical activity are equally important for learning.

> **'Drawing isn't a doing thing; it is a thinking thing. People that do it really well will have thought about the drawing they've done and reflected on it and then they do another one and then they reflect on that. And that's how you make progress with a skill as simple and as complex as drawing.'**
> Sam Cawthorne

The cognitive and physical skills that students learn through this practical learning are as relevant for them in real world contexts as they are when learning about art.

> **'It allows flexibility of mind; it's developing tactile skills. We deal with the tactile world all the time. Though many more things are about theory and understanding, in terms of cognition, we are still navigating a material universe, and I think that's part of what we're doing.'** Sam Cawthorne

Using a full range of teaching methods

KES teachers take great care in planning the practical learning opportunities to ensure that students have requisite skills when they need them. For example, understanding how a drill works in Year 7, but being able to select the right bit for the drill in Year 9.

> **'I think a lot about it when I'm planning what skills I want the student to be able to do... so it's thinking about what skills I want them to have grasped by the end of either the lesson or project or topic'**
> Beth Hastings

Just as important as planning the curriculum are the opportunities that teachers take to model the skills and character traits the school is promoting. So, when teachers model art processes, such as colour blending, they will model mistakes as well, so they can show students how to correct their own mistakes. This encourages students to apply their knowledge to avoid making future mistakes, to refine their technique further, and be prepared to find solutions when results do not turn out as expected.

‘Be honest about mistakes and use them as learning experiences, so when things go wrong for you, show that you mirror or model that resilience. You want your students to be able to talk about that, and about how you’d move that problem forward.’
Sam Cawthorne

Dispositions such as resilience and a desire to improve on one’s work are also encouraged through trust and the relationships developed between student and teacher during practical lessons. Teachers feel as if they are:

> **‘Working side by side with students rather than standing at the front’.**
> Helen Vardy

Cultivating learner agency

Many students missed the opportunity to engage in genuine practical work during periods of lockdown. For example, science experiments watched online were no substitute for the real thing.

> **‘You can just tap and then you’re not really doing much, so you have to listen to someone speaking, it’s a bit boring.’**
> Year 10 student

Whereas they value the practical experience for developing their independence in learning.

‘You’re not learning it on your work-sheet, you’re doing it for yourselves and seeing how it works.’
Year 10 student

As teachers are concerned to re-build confidence acquired through practical learning that students may have lost during lockdowns, D&T students have worked more with corrugated cardboard to create designs and prototypes. The recyclable nature of the cardboard encourages students to be more willing to make mistakes and to keep further refining their work until they are happy with it. This develops the disposition to continually improve, which is second nature to an engineer, or a D&T teacher.

> **‘To me, it’s something I don’t even think about. I don’t expect to get it right my first time. When I’m making something, I expect to make lots of prototypes, and refine it.’**
> Helen Vardy

Practical learning enhances students’ ability to learn from their mistakes and work more creatively.

‘Whenever I’m making mistakes, sometimes it can turn into a completely different thing that’s probably better than the original idea.’
Year 7 student

Students understand the value of working in groups for learning. They learn how to communicate with people they might not know and about teamwork in the workplace. They are also comfortable working independently.

> **‘With groups, you have more ideas, so you can get a project done better, but some people, if you have an idea, say, Oh no, that’s a bad idea, but if you’re doing it by yourself, there’s no-one telling you can’t, but I think they’re both really good.’**
> Year 7 student

Practical learning empowers students to develop skills for the future.

> **‘So, if something breaks, and you have a good skill set, you could maybe fix it, instead of just going out and buying a new one or paying quite a lot for it to get repaired.’**
> Year 7 student

Tracking learner progression

To a great extent, assessment drives student engagement, and some teachers believe that GCSEs do not pay enough attention to assessing practical skills. KES teachers are determined to assign value to these skills and ensure that students are prepared for exams by being able to recall their physical activities to help them answer exam questions.

‘I ask them those skills-based questions where they might have to recall the physical activity of doing something. I make a point of saying to the students, look, I’m going to assess your skill, it’s really important that you understand this.’ Beth Hastings

Capturing students’ progress in D&T and art, their use of skills and understanding of processes, rather than just assessing an end product, was actually enhanced during COVID-19 lockdowns.

> **‘Because they had their devices, they were able to capture their practical skills really well. This is something we’re still working on, in terms of how we evidence the practical work. There’s obviously such a journey, from coming up with a product to an idea for the finished product. That whole journey is really important, and I think it’s difficult to capture it.’**
> Beth Hastings

Art assessment is also challenging. Teachers have been working to create an assessment environment for students that prepares students for the real world. There they may find that judgements about their work are more subjective, so it is important that they develop resilience and can:

> **‘Take feedback on something and still be able to move things forward, I think it’s an important**

aspect of it... and that's the way we've started to try and frame grading and marking.'
Sam Cawthorne

Success is defined by teachers both as individual student engagement, which they observe in the classroom:

'Success comes down more to an individual level, and it's about whether that student is engaged in the subject, and they've done things that they feel have been worthwhile.'
Sam Cawthorne

And also, by looking at the varied careers that students go into.

'I think my big thing is my student destinations, I have three or four students who have gone to work for McLaren.'
Helen Vardy

Endnotes

1. www.merciatrust.co.uk
2. www.ecgbert.sheffield.sch.uk/page/?title=System+Leading+School&pid=195
3. www.worldclass-schools.org
4. www.ecgbert.sheffield.sch.uk/page/?title=Welcome&pid=159
5. www.youtube.com/watch?v=IqHLdFByMfU
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