A photograph of two young girls in a science laboratory. They are both wearing white lab coats over yellow and black school uniforms. The girl in the foreground has long red hair in two braids and wears black-rimmed glasses. She is looking down at an open notebook. The girl in the background is wearing safety goggles and is also looking at the notebook, holding a pen. The notebook has a table and a diagram on it. The background shows lab equipment like beakers and a sink.

# EFFECTIVE PEDAGOGIES FOR GIRLS' LEARNING

A review of recent research

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# ABSTRACT

**Gender issues have been a focus for many educational research studies in recent decades, sparked by the differential responses of girls and boys to schooling. Differential retention rates, an apparent gender gap in achievement between girls and boys, subject choices at GCSE and A level, access rates to University, have all been scrutinised, with ambivalent outcomes.**

This research review focuses on one aspect of this gender debate: effective pedagogies for girls' learning. In so doing, an attempt is made to consider whether girls and boys are best taught in single-sex classrooms, whether learning is better facilitated in such classrooms, whether girls and boys have different learning styles, whether there are girl-friendly pedagogies which are distinct from pedagogies which support boys' learning.

The essence of the review, however, is to support teachers: to help teachers to identify, within their own contexts, those learning and teaching strategies which enable girls to maximise their own potential, and to succeed in their education, without sacrificing the essence of their own self.



Girls' Day  
School Trust





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Mike Younger was Dean of Education and Head of the Cambridge Faculty of Education, 2006-2012, and subsequently lead consultant for the Faculty in establishing a new Graduate School of Education at Nazarbayev University, Kazakhstan. Mike's main research and teaching interests are located in teacher education and professional development, and in gender studies. He co-directed, with Molly Warrington, a UK-government sponsored project on raising boys' achievement within inclusive contexts, a project which led to a highly influential report, two major books and over twenty mainstream research publications. He has lectured extensively on gender issues throughout Europe and in parts of North America and Africa.

More recently, Mike was Director of the University's Centre of Commonwealth Education, which involved him in co-directing projects based in East Africa on the retention of girls into secondary schooling, developing teacher education programmes in Tanzania and Namibia, and working with governments in the Caribbean to explore gender discrimination in secondary education. In 2012-13, Mike led a research study, based in three GDST Schools, on optimizing the effectiveness of single-sex education of girls.





# INTRODUCTION

The GDST has a long history of pioneering innovation in girls' education, for over 140 years aiming to provide an outstanding academic education and to help girls develop into rounded confident women, who can both maximise the opportunities open to girls, and meet and overcome the challenges they face in the modern world today. Thus the GDST website maintains that the ethos of the schools today is grounded around a number of key beliefs:

- that girls should be able to flourish in supportive surroundings;
- that the best environment in which this can happen is single-sex;
- that GDST schools ... should develop their own characters, their own strengths and interests, their own place in the individual communities they serve – but that they should have a shared DNA, a shared and consistent commitment to strive and succeed;
- that the academic and social climate we create should be reassuring, but exciting, so that girls have the confidence to reach beyond their own perceived limits;
- that every girl should feel she belongs ... should be happy... should be resilient ...should leave school academically and mentally equipped to succeed in whatever field is right for her.

*([www.gdst.net](http://www.gdst.net), accessed 29 July, 2013)*

Stannard, in an unpublished report on the GDST perspective on girls'-only education (GDST website, July 2013) maintains that "girls' learning needs, styles and preferences are different from those of boys... girls experience the external environment differently from boys. In particular, even today gender stereotyping and gender differences in expectations and, often, self-definition, tend to affect girls' behaviour, attitudes and choices, unless they are checked and challenged at school". Arguing that "in single-sex schools, girls are less likely to conform to a priori gender stereotypes, less constrained in their choice of subjects, show a greater propensity to take risks and innovate, perform better in examinations, have more opportunities to show leadership", he nonetheless acknowledges that "to be successful, single-sex education must be more than an organisational device – it needs to be underpinned by a set of principles, and articulated in a set of practices, whereby girls can be nurtured, challenged and empowered".



There is a good deal of confidence here in the value of single-sex schools and single-sex environments for teaching and learning. But it is self-evident that not all selective, independent girls'-only schools have the same level of academic success, empower girls successfully, enable girls to feel at ease with themselves and their education, and create women who have the ability, drive and determination to help make the world a different and a better place. Indeed, it can be argued that - whilst single-sex schooling and single-sex classes in coeducational schools have the potential to benefit both girls and boys in terms of their achievements, aspirations and confidence - they are no panacea in themselves in terms of improving educational outcomes. Successive studies have shown that separating the sexes of itself frequently has little positive benefit, and that it is necessary to address teaching and learning strategies, the overall 'culture' of the school and curriculum issues, in order to have significant impact.

So how can the teaching environment, whether in single-sex or co-educational classes, be maximised to enhance the learning and academic achievements of girls? What are the circumstances whereby female students can be enabled to feel more comfortable and at ease with themselves and each other, more motivated and engaged so that they achieve to their potential?

The discussion which follows draws extensively upon research carried out in three GDST schools (Younger et al, 2013), but it is cross-referenced to research findings reported in the literature about girls' learning generally, whether in single-sex or co-educational environments. This research is based upon classroom observations of teaching, interviews with teachers and parents, and focus group interviews with girls themselves. In essence, the central message of this report is that notions of gender-specific pedagogies, based on the belief that girls and boys have distinctly different learning styles, are too generalised and indiscriminate to be of effective use in planning learning and teaching strategies for the classroom. Nonetheless, research does suggest that on occasions teachers implicitly use pedagogic practices which differ in subtle respects to take into account the learning approaches and needs of girls, and in this sense, such practices can be described as 'girl-friendly', without implying that they are not suited too to the needs of some boys.





# GIRLS' PERSPECTIVES

## Most effective lessons which support and facilitate learning

Whenever focus group interviews with students form part of research projects, the outcomes are similar (MacBeath et al, 2003; Rudduck & Flutter, 2004; Younger et al, 2005; Warrington et al, 2006), such that it is remarkable that texts on pedagogy do not highlight these insights more explicitly. In the research in the GDST schools, for example (Younger et al, 2013), most effective lessons were characterised as having a clearly visible and articulated structure, with a “high impact start which takes our interest and gets us listening and involved; the teacher intrigues and captures us”.

The lessons where “we learn most have a format which is explained... but not only this, the teacher keeps to it, we can follow it through and see where it is going and where we are ... everything is set out carefully, there is good pace, clear explanations which are repeated where necessary”. But girls stressed that lessons needed flexibility, “to cater for things which arise and we don’t understand”, and teachers needed to create a sense of security, with a clear direction and helpful prompts. Many times, girls stressed the importance of the teacher offering a coherent summary at the end of the lesson, so that “you know what you should have gained from the lesson... if you do not understand, then you know what to ask about, and seek extra help”.





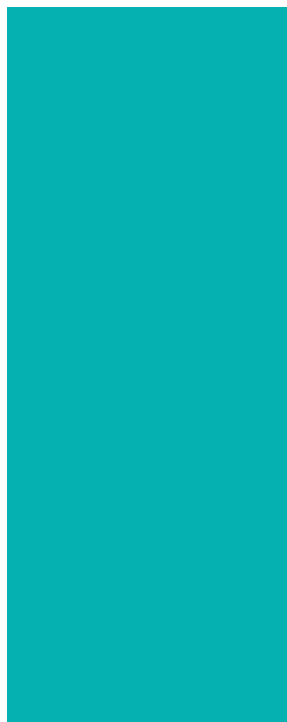
High value was also placed on lessons which offered variety and interactive approaches ... role play, games, "groupwork to get different opinions, to share ideas and get more ideas", hot seating activities in drama, "making cake volcanoes", participating in historical debates. An emphasis on collaborative learning was also welcomed because "groupwork encourages learning... you share and discuss ideas... you can try things out ... you can compare with other people, learn from other people, realise when you need to do better".

**"One of the new guys got us to do groupwork, and we do massive presentations back... I can still remember the things we talked about... our work, our language, he made learning accessible to us. We did physical displays of population change... he moved us all about, physically, to show geographical phenomena at work... it's cool and so enjoyable, and different each lesson".**

Significantly, though, interactivity does not always mean variety, because there is the need for space and time to complete tasks properly: "We know it's tricky for teachers, but it is soooo important to get the pace right, to give extension work which is interesting not boring, and to give us time to learn... sometimes teachers try to create a whirlwind of activities, and it gets too much".

Many of these points are well-rehearsed, of course, in initial and continuing teacher education courses, about the nature of effective lessons, but there are subtle variants in these descriptions by the girls, and challenge to some accepted strategies, particularly in regard to pace, variety of activity and independent work. Equally, girls commented on the particular effectiveness of lessons where teachers allowed a dialogue about learning: "...how you learn, what you are not understanding, the purposes of activities... the need to continually ask questions to clarify learning".

When they learnt best, girls stressed that the teacher actively taught them, was not simply going through a set of routines but challenged, demanded, offered explanations in different ways, got girls to teach each other: "Teachers find clever ways of explaining things... showing things... helping you through the difficulties". In such a context, "lessons are not exactly fun, because you are always on the alert, but you get a huge sense of satisfaction because you know you are learning, and you feel secure and good about it". Then, as several girls noted, "the lesson is actually a partnership in learning" and "you learn loads".





# TEACHERS' VOICES AND ASPIRATIONS

In the GDST research, many teachers - asked to identify the characteristics of a good lesson of theirs – reflected back the girls' own descriptions: developing a variety and range of different of activities within the lesson, encouraging self-discovery amongst the girls to support learning, insisting on the girls doing the thinking rather than being directed, emphasising the importance of getting the girls to take ownership of and responsibility for their own learning, facilitating a summary of the lesson to give security and reinforce learning:

"...when you observe, I hope you will see an environment where it is OK to have a go, to push yourself beyond comfort zones... where girls are not simply parroting back information which I know they know because I have taught them, but are able to think, explore ideas we are looking at... also I hope you will see the girls making suggestions about their learning, based upon their experiences from other lessons, in a culture of mutual feedback". (Science)

"I hope you will see that the girls are sparked and motivated, showing an enthusiastic interest in what we are doing. Year 9 girls are easily bored, so I want to challenge, offer variety, instil energy and pace". (English)

"...they will be confident using machinery and in workshop... helpful to one another, chatting to each other about their work... a busy, happy working environment... I'm quite a relaxed teacher but girls know where the line is... so they know how to behave... flexible environment, moving around, variety, activity... I am all over the place, advising, helping, supporting... recapping on the previous week's lesson... so that I know they know what they are doing". (Design Technology)

"I have a direct style, giving impetus, pace, clear instructions and directions... and technology to support... smartboards, iPads, videos, modelling... I engender a 'have a go' ethos... I want my lessons to spark an active interest, enjoyment... I set out clear objectives and structure so that there is a clear direction but above all there is activity, lots of different activities, energy... variety and challenge are built in". (Humanities)

"A good lesson of mine, I hope, will make my students active... I don't want them to be scared of maths or uninvolved... I make it fun, make them come to the board to discuss and to work through problems... I want to give them enthusiasm for learning, confidence to learn... they need time and space to discuss and to understand... good discussion is quiet and productive, not noisy... sharing difficulties with each other to help understanding". (Maths)



Teachers emphasised the importance of generating discussion, of explicitly showing that they were receptive to ideas from girls and that girls needed to engage in collaborative talk to clarify and consolidate their own learning, of creating space so that girls could talk themselves into understanding:

"I encourage the girls to listen and share with others... in pairs, then in small groups, then speaking out on behalf of others in the group and receiving feedback from other girls... it is important to develop an inclusive culture... think, pair, share". (Humanities)

In this vein, too, teachers stressed that, in a good lesson, they would want to encourage girls 'to risk and explore, testing their powers of reasoning against and with others', interacting with the girls to give immediate verbal feedback, to encourage, to affirm, to challenge:

"It's particularly important in Drama, using lots of praise and encouragement to give confidence and security; a good lesson requires high levels of energy and input from me, to monitor, stimulate, direct, interact, provoke. The design of the lesson is really important... highly interactive style, circulating to generate and support ideas on a groupwork basis... I do a lot of modelling... to create comfort / risk-taking... explicitly thinking about developing trust and comfort". (Drama)

This emphasis on exploration, freedom and risk emerges, too, in the context of some practical subjects:

"I want them to feel it is OK to try things out... to create an open, exploratory, 'don't worry about it', environment... to challenge them: 'I'm not too sure about that, why don't you try it'... I take a step back, pretend to be unsure, try to generate faith in them feeling it doesn't matter if it goes wrong, generate enjoyment and stimulation... I insist they try, work things out, take chances... need to have fun and enjoy it, but not cross the line... bring charisma and fun to learning, but if they slip up on health and safety, they don't do it again!!" (Design Technology)

In one school, discrete lessons on critical thinking had been developed to explicitly encourage girls to think outside the box, to challenge evidence and plausibility of sources, to explore the credibility and internal consistency of arguments:

"A good lesson of mine challenges girls to think rather than to be obsessed by what is in their file; to ask open questions, to bring exploration and dispute into the classroom. Some girls are initially terrified, panic in extreme that they don't have right answer, but I try to help them, systematically and logically, to move outside their comfort zone... but it can be agonising for them". (Critical Thinking)





# WIDER RESEARCH PERSPECTIVES ON PEDAGOGY

It is worth reflecting here on the teaching approaches and pedagogic practices advocated by these students and teachers across these three schools, and to locate their discussion within the wider educational research discourse.

- Recent neuroscience research (Goswami and Bryant, 2007) shows that learning depends on the development of multi-sensory networks of neurons distributed across the entire brain. A concept may depend on neurons being simultaneously active in visual, spatial, memory, deductive and kinaesthetic regions, in both brain hemispheres; thus ideas such as left-brain/right-brain learning, or unisensory 'learning styles' (visual, auditory or kinaesthetic) are not supported by the brain science of learning. So – as observed in many of the classrooms in these three schools - we need multi-sensory approaches to teaching, stimulated through a variety of activity and engagement.

- Individual differences in the ability to benefit from instruction, identified by Vygotsky (1978) as the 'zone of proximal development' (Zaretskii, 2009), are large in young children, so any class of children must be treated as individuals, whilst remembering that learning by children is primarily a social activity requiring common goals and shared activities. The central role of learning from others is highlighted by Vygotsky's research, which indicates how much further a child can go when learning with the support of a teacher, parent, carer or peer; such interactions need language, challenge, and activity.

- Dweck's research (1986, 1999) argues that teachers should praise effort rather than performance. Children's self-theories of intelligence influence their response to schooling and their motivation to learn. As Dweck has shown, children who believe that their intelligence is fixed are less likely to make an effort to learn, whereas those who believe that their intelligence can grow will try harder when faced with a learning challenge. If teachers praise effort rather than performance, children's intrinsic theories can be altered and children's motivation to learn can increase.







- The educational value of collaborative learning has been clearly demonstrated, by research from more than one line of enquiry (Howe and Mercer, 2007). In particular, encouraging children to pursue joint goals, explain their understanding, express different points of view and attempt to reach consensus through discussion have all been found to help learning and understanding. Research on collaborative learning across the arts, science and mathematics supports the view that joint activity among pupils should be an intrinsic and integrated aspect of classroom life.

- Dialogic teaching (Alexander, 2008) provides the best chance for children to develop the diverse learning talk repertoire on which different kinds of thinking and understanding are predicated. Such teaching is:

- collective: teachers and children address learning tasks together, whether as a group or as a class;
- reciprocal: teachers and children listen to each other, share ideas and consider alternative viewpoints;
- supportive: children articulate their ideas freely, without fear of embarrassment over 'wrong' answers; and they help each other to reach common understandings;
- cumulative: teachers and children build on their own and each other's ideas and chain them into coherent lines of thinking and enquiry;
- purposeful: teachers plan and steer classroom talk with specific educational goals in view.

- Productive peer interaction depends on the nature of the talk among pupils in their groups, and in particular the achievement of what Barnes and Mercer call 'exploratory talk' (Barnes and Hodgkinson, 2008), such that children may 'talk themselves into understanding'. This involves children in sharing, challenging and evaluating their views.

- Research from the SPRinG (Social Pedagogic Research into Group work) project (Galton et al, 2009) shows that groupwork is most effective when it encourages pupils to take an active role in their own learning, and encourages pupils to think and talk about their understanding, to question ideas and get ideas from others. So problem solving, project work, group discussion of issues, decision making tasks, tasks that involve sharing information, researching an issue, all stimulate learning. The SPRinG project helped schools develop effective groupwork in which children didn't just sit together, they thought and talked together.

There is clear connectivity here between the practices and views expressed by some of the observed teachers which were discussed earlier and wider research findings; in particular, the encouragement of dialogic talk to explore meanings and develop understanding, the focus on variety and activity, the encouragement of risk-taking, the need for active and collaborative groupwork, and the emphasis on learning without preconceived limits.



# THE GDST RESEARCH

## The essence of good practice

The GDST research (Younger et al, 2013) focused on how far the aspirations of girls and teachers – of the nature of pedagogy and good practice in the classroom - were realised, on how far the rhetoric was matched by practice. The research suggested that effective teachers continually offered appropriate challenges in an encouraging context and that girls need to be prepared to risk, on occasions to think outside the box, to meet the high expectations of the teacher. In the GDST context, girls who appeared not sufficiently focused, offered superficial answers or who were quietly off-task were constantly challenged by teachers who were alert and sensitive to the individual capabilities of different girls. Thus in an English lesson, for example, a girl who wanted to write a short story was warned that “it might not be a sufficient challenge... you might try write in the style of Hemingway, though”, and many girls appeared to be happy to be invited to take more risks with their writing, to be encouraged to think more profoundly about the text in question.

Lesson observations revealed a number of very distinctive characteristics of effective lessons, which were common across subjects and schools. Teachers were very high profile in these lessons, driving learning forward at a fast pace, usually involving all the girls in the lessons, probing, reassuring, directing questions and comments to individual girls by name. Some lessons had a great variety of activity, at real pace, such that girls might be engaged in six or seven different activities across an hour's lesson; other lessons were characterised by more sustained activity, with perhaps only two activities completed in depth. Teachers used an expressive and lively style, presenting energetic, lively, committed presences in the classrooms, which engaged, enthused and energised the girls. Lessons were well-ordered and highly organised, maximising the teaching and learning time available, moving from one activity to the next without dislocation, with a very clear structure of different activities which were almost always articulated to the girls at the outset.

Most lessons, in all subjects, demanded a great deal of interactive and collaborative learning from the girls, with a mix of individual work and pairwork, groupwork tasks and role play, involving constant feedback from and to the girls, and whole class consolidation. Dialogue was high profile in most lessons: teachers continually gave girls space to explore and develop their understandings, to work out their responses in pairs, to cross-check with another pair, to think aloud and to talk themselves into learning. In many subjects, teachers continually encouraged higher level responses and demanded reasoning, hypothesising, conjecture from the girls. Praise was offered regularly and meaningfully, encouraging further contributions and risk-taking, and helping to stimulate the girls' thinking skills, developing further the process of enquiry and encouraging creative thinking. Thus in Mathematics lessons, for example, teachers skilfully used a predominance of open questions to allow independent thought, and made extensive use of praise to reassure and give security, such that the girls were happy to take risks and ‘have a go’, and did not appear to be too concerned about making mistakes. Throughout, teachers encouraged girls to talk to each other and to them about mathematics, and the difficulties and challenges they were encountering in developing their understanding. The ethos in the classrooms supported this easy and regular communication, with girls working together, encouraged by teachers to push themselves to learn.



Throughout many lessons, there was frequently the sense of the teacher working as one of a team, of a collaborative partnership at work, fostering independent learning but within a supportive, secure environment. The atmosphere of engagement meant that on occasions, lessons were noisy and vibrant, prompting teacher interventions, but this was rarely in response to off-task or disengaged activity, but indeed, the opposite, where the teacher had created opportunities for dialogue, justification, clarification, and a context – through small group work – where the girls were interacting vigorously to encourage and support each other, identifying in their own contributions WWW (what went well) and potential changes which would make their work EBI (even better if).

Humour was often used by the teachers in a quiet, encouraging way, to establish an extremely easy and positive rapport between girls and teachers, with teachers in turn willing to accept humorous and jokey responses from the girls. Girls read the situations well, receiving and accepting affirmation through the tone of voice of the teachers, their body language, and through their informality.

In these lessons, the girls showed leadership and teamwork skills, developing a mature, confident, and assertive approach to learning; in both English and Drama lessons, for example, they consistently revealed the ability to reflect positively but robustly on ideas and performance, both their own and that of their peers, and were uninhibited in expressing themselves. Throughout lessons, teachers used approaches and content which generated involvement and engagement, and helped the girls to develop a real sense of confidence and self-belief in their own skills, qualities and abilities.

In part, this style of lesson was enabled by the enthusiasm and willingness of the girls to participate. There were few challenges to discipline, and when these did arise, they were dealt with quietly and efficiently by teachers. The context facilitated learning, then, but teachers used the context extremely well to enable learning. In each lesson, teachers created secure learning environments through a variety of techniques... offering praise, giving reassurance, presenting clear and direct instructions to reassure when necessary, referring back to previous learning, signposting what to look for, asking direct and challenging questions. In Modern Language lessons, for example, teachers worked hard to encourage pair working and speaking in the target language, and to create the security for girls to engage and to take risks with their learning... at times, they were enthusiastic but hesitant, beginning responses with "It might be wrong but..." and "I am not at all sure but could it be...?" Teachers worked hard to support such thinking aloud, to offer prompts and corrections in positive ways, avoiding negative connotations, and to facilitate peer support with learning.

Interactive whiteboards were central to some lessons, with girls invited to consider issues and answer questions at the front of the class, to consolidate their previous learning and to offer support and explanations to other girls. Girls frequently commented on each other's work, volunteered to publicly share what they had found difficult and received help and suggestions from other girls. Most girls engaged in this collaborative and participatory exercise, and welcomed the opportunity to share their knowledge and difficulties in a public forum. In Mathematics, for example, girls were given the opportunity to engage in public dialogue about the investigations under discussion, to work through mathematical problems themselves and to gain confidence from so doing, rather than the technology serving as an extension of an overhead projector.

This generic discussion captures the essence of good pedagogic practices observed continually in the classrooms in the research schools. The richness of the evidence is only fully appreciated, however, in the detail, and so brief vignettes of the practices of three teachers are presented, in different subjects, to exemplify these practices in more detail.





## Case Studies: **SCIENCE**

In one school, a science teacher had developed a relatively informal style of teaching which was highly effective. Lessons were almost entirely small group-based, with the teacher identifying and outlining the theme for the lesson, establishing procedures for the experiment when appropriate, and then engaging herself directly in the groupwork as it evolved, clarifying and commenting on issues to the whole class as they emerged from different groups. The teacher had a strong, dynamic presence in classroom; listening, watching, shrewdly intervening when appropriate, creating space for learning. In each lesson, the girls were immediately engaged, active, interested and cooperative, continually pressed to clarify understanding, to justify decision-making, to make judgements. This created very effective teacher-support for learning, but equally established a collaborative ethos in the laboratory, with girls effectively leading learning on, supporting each other and helping others, contributing to the emergence of a supportive, caring environment for learning.

Thus in a lesson themed around osmosis in plant tissue (potato chips), the teacher used the homework task (revise the theory of osmosis) quickly to establish the context for the lesson: 'Once you have analysed your data, you need to explain it, not just describe it... Think about how you handled the data... evaluating the validity and reliability of the data... identify the independent and dependent variables... what were the control variables? ...describe and explain changes noted in the mass (need to use theory of osmosis here)... finally: are your results reliable? Is your range good? What would improve the reliability and validity of your results?'





The teacher gave structure for the lesson to the girls and timings for activities: “you’ll have finished the methods section by Noon... then you’ll have time for data presentation, analysis... well do you *think* a graph would help? How? Why? ...if you do it like that, it might be really exciting and show you some really interesting things... what do you think?” The lesson proceeded throughout in similar fashion, with the emphasis on exploration, challenge, intrigue, developing understanding.

A vibrant, energetic working environment was established, based on lively, frequently humorous teacher-girl interactions, with many girl-girl learning conversations, which were all focused, on-task, inquisitive. The teacher’s easy relaxed style (dry humour / a lot of smiles / real enthusiasm for subject) enabled the girls to identify with the tasks, to really think, to work out issues... to engage in risk-taking in a totally safe, non-threatening environment. The teacher used extensive and explicit praise throughout, publicly expressed praise but often directed to individuals, to consolidate the feeling of a collaborative learning environment, with all the girls sharing in the experiences; excitement and engagement buzzed around the room. As the lesson proceeded, the teacher added complications to the interchanges, to demand more from the girls... “perhaps you need to deal with the graph in two sections, to get valid conclusions, do you think? A---, can you predict what will happen? ... Yes, that’s called...? Lysis ... brilliant, well done...” and moved on to discuss issues of fair-testing, reliability of experiments, and the dilemmas involved in interpreting results.

This was a vibrant and enjoyable lesson for the girls and the teacher, creating space for girls’ exploration, support of each other (one girl who had finished was invited to ‘help your group’), risk-taking, developing understanding of crucial scientific concepts. The teacher stressed her high expectations through the pace of the lesson, questioning, praise, but also exhibited a subtle reading of signs of misunderstandings. All girls participated, some leading, some following, but all were engaged in learning.



## Case Studies: DESIGN TECHNOLOGY

Design Technology lessons observed in the two schools shared similar characteristics in terms of lesson structure, process and procedure, revolving around individual, task-oriented work, with girls moving their own projects on, with encouragement and affirmation from the teacher (and in one school, from the technician, who had a strong teaching–support role). But there were also subtle differences of approach and a significantly different style between the two teachers, with one exhibiting more informality, flamboyance and banter between teacher and girls. Lessons in this school were noisy (with machines and background music), at times seemingly high risk (in terms of content) and demanding of the girls. Much of the emphasis of the teacher’s interactions was on creating confidence and encouraging risk-taking and innovative thought: “It doesn’t matter if it goes wrong; just think it through”, and the teacher constantly used humour to establish rapport, to laugh off silly mistakes: “you haven’t drilled into my table, have you?!”, and to challenge through really constructive and productive exchanges:

T: ‘What’s the problem?’

G: ... ‘It’s not right ... I’ve made the whole thing too big...’

T: ...‘never mind ... just re-think the join ... it’s not an issue at all’

G: ...‘Oh, OK ... this is so much fun!’

At one level, the students appeared to speak to the teacher as an equal, but it was equally obvious that the girls were keen to listen and learn, to impress, and the teacher’s style gave them the confidence to bounce ideas off each other and the teacher, and to move learning on. When a pupil used one of the more ‘dramatic’ tools (mini chainsaw), the teacher stood close by to support and advise, but the girl was taught to be “master [sic] of the machine”, and the teacher asked a series of clarifying and supporting questions: “What happens if it cuts slowly? Is this [shape] what you want? Did you feel the power?” With another student, the teacher demonstrated a technique and allowed the girl to copy; unbidden, all the other girls stopped in their tracks, to watch and learn, and showed obvious respect for the teacher’s skill.





Throughout these lessons, the teacher continually supported girls in their own learning, responding to them as individuals, offering explanations, questions to prompt, probe and clarify issues, and creating an atmosphere to inspire and to challenge the girls to be original and creative. To the teacher, "there are never wrong questions in D and T because questions generate ideas, they help you find possible answers and solutions yourselves... the key to success is not to panic, realise your potential and discuss and reflect lots". In these lessons, it appeared the norm to challenge, support, question, share: "Let's do this, girls... S----- has a really good question here ... say it again, louder, so we can all benefit... this isn't going to be published ... I just want free thoughts... talk about your mistakes, reflect on them and ask for help... it's an emotional rollercoaster... but if you have challenged yourself, you will feel so good at the end".

The teacher was trying throughout to reinforce and develop the resilience of the girls, within a relaxed and collaborative atmosphere, monitoring and supporting through questioning and commenting, encouraging independent work and effort. The girls grew in confidence because they felt able to ask any question, to share their difficulties, safe in the knowledge that their ideas would never be scorned or diminished, and always taken seriously.





A young girl with dark hair in a school uniform is looking down at a small white card she is holding. She is pointing at the card with her right index finger. In the background, another student is partially visible, and the setting appears to be a classroom.

## Case Studies: **GEOGRAPHY**

In another school context, analysis of a series of Geography lessons exemplifies the pace, variety of activities and interactivity identified earlier in this discussion. Indeed, momentum and variety were the hallmarks of these lessons, with a stimulating mix of groupwork, drama, games, individual work, videos and teacher exposition, sometimes in the same lesson; one observer noted that the style was “warm and charming, fast moving and vibrant, ‘full-on’ in every respect”. One lesson illustrated this: the initial activity was a game, a quiz on the Interactive Whiteboard, on the topic of chalk coastal processes, to revise previous learning; girls were invited up to the front to offer answers, and others participated by discussing and arguing through the merits of the answers offered. An activity based on charades followed, with girls using their drama skills to perform the motion of waves on the seashore, and the differential activity on headlands and bays, using kinaesthetic based activity to develop their understanding. This led on to a groupwork activity, based around mixing / sorting cards to sequence the formation of coastal features (‘stack, arch, cave, headland), an activity which was short but sharp, purposeful, generating involvement, discussion and debate, with many rapid-fire questions from the teacher to different girls.







A Lulworth Cove video mystery exercise followed, based around a video made by the teacher (which enthralled the girls), with the girls challenged to identify and discuss evidence which would help them understand the formation of geographical features such as coves. This did indeed generate extensive discussion between the girls, sometimes with the teacher prompting and clarifying, but equally on occasions he allowed the girl-girl-girl dialogue and exploration to continue unabated: "How come the river used to be bigger?" ... "I would have thought that..." ... "*why* is that rock harder to erode?" ... "how come it's not totally worn away then?"

Girls were allowed space to clarify all aspects of their thinking, to express themselves, to think independently. Finally, the girls were asked to work in silence on an individual, written task on cove formation, to show the understanding and knowledge they had gained in the lesson, and this was followed by peer assessment, with the girls exchanging books, reading the answers of other girls to check for evidence, to highlight 'top quality detail'. This sharing of ideas, learning through active consideration and assessment of the work of their peers, illustrated collaborative and cooperative learning at its best: "Oh, you wrote that... yes... I need to add that to mine".

Not all lessons can, or even should, be as interactive, varied and potentially exhausting (for teacher as well as girls!) as this example, but here we have many of the characteristics of lessons which are enabled in learning environments such as existed in these schools: the teacher high profile in offering explanations and posing questions to support learning and in offering praise; girls very engaged and on-task, asking many clarifying questions, and positively thriving on the pace of the lesson and on the range of different activities; girls confident to participate, learning from mistakes in a safe and enjoyable environment; and a positive, collaborative team approach, with girls gaining confidence from the teacher's positive feedback and from peer collaboration and feedback.



# A 'GIRL-FRIENDLY' PEDAGOGY

## Gender-specific learning styles?

In the GDST research, lesson observations and subsequent discussions with the teachers revealed that a gender-specific pedagogy was not high-profile in their approaches. As outlined earlier, the teachers who were observed in their teaching had previously been interviewed about the teaching styles and pedagogic approaches they adopted in girls'-only classrooms. In many respects, there is a close parallel between their rhetoric and the reality of their practices, with little mismatch between what they said they did and what they actually did in their classrooms.

Thus in both their rhetoric and their practice, teachers placed emphasis on being *enabled* to teach by the collaborative ethos established within the schools and by girls who were keen to learn. Frequently, they took advantage of the girls'-only space to promote talk, to encourage girls to talk to each other about the topic under discussion, and to stimulate exploratory dialogue and self-discovery in an environment which – for the most part – was free from ridicule and the fear of undermining self-image. Their lessons were characterised by a vibrant, interactive style, with a clear structure and varied, well-paced activities, which intrigued, challenged and made demands of the girls, and on occasions created quite intense and powerful contexts for learning.

Many of these characteristics, of course, could be said to be common to any classroom where really effective and demanding teaching is taking place. There is little direct hint here of gender-specific pedagogies, tailored to the explicit learning styles of girls. Likewise, there was little in the approach of the observed teachers which indicated that gender-specificity was high profile; certainly the structure, dynamic pace and demands of the many lessons would not have been out of place in boys'-only or mixed classes. This, too, accords with the teachers' responses during interview, since few acknowledged that they consciously taught girls differently to boys, or felt that there was a distinct learning style necessary in a girls'-only context. Whilst on occasions there was some hint that the subject content and the curriculum was tailored to girls, and that girls were able to be more uninhibited in their responses in single-sex classrooms, there rarely was an assertion that pedagogic practices differed to take into account the learning styles and needs of girls.

These perspectives were reiterated and reinforced in the interviews with members of the Senior Leadership Team (SLT) in each school, where there was common agreement that boys and girls as learners shared more common characteristics than differences, and that the learning styles of boys and girls were not significantly different. These accord with much of the current research, summarised by Younger and Warrington (2005):





**"We acknowledge that there are very real dangers in the learning styles debate, as it is currently constructed, especially so when it suggests that learning styles have a significant gender dimension in their distribution; the research evidence does not support this contention. We concur with the findings of Coffield et al (Coffield et al, 2004) when they argue that much of the current advice proffered by a thriving commercial industry to teachers and managers on learning styles consists of...**

**... inflated claims and sweeping conclusions which go beyond the current knowledge base and the specific recommendation of particular theories...**

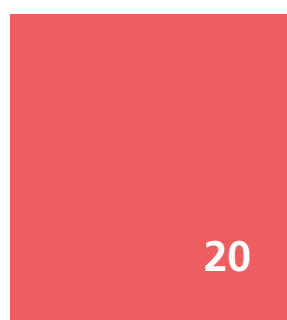
**... and that more independent empirical research is needed to assess the real pedagogical potential of different learning style model...girls' and boys' learning styles are not stable and pre-determined in origin, but are flexible and can change through time, in response to different styles of teaching and to learning opportunities".**

*(Younger & Warrington, 2005, p37 & 92)*

There is a paradox here, however, which needs more exploration and discussion, since there was a recognition by the SLTs in each school and evidence from classroom practice that the delivery of the curriculum in the classroom did differ, that teachers did recognise that there were subtle differences between how they approached girls and boys in the classroom.

One significant difference was the degree of reassurance offered by teachers. Whether in History, Geography, Design Technology, Science or Mathematics, it was noticeable that – however confident the girls appeared - they frequently sought more assurance and security by asking very many questions, some open, some closed, some high level, some low level. As a consequence, teachers took time and space to reassure, to reiterate, to clarify, responding openly and patiently to questions even when their reactions on occasions suggested that the girls were less confident in their own abilities than they ought to have been. To quote one teacher:

"... girls arrive with lots of energy, they want to resolve uncertainties, they are seeking reassurance over homework, lesson procedures... if you try something different in a lesson, and it goes wrong, boys accept the risk; with girls, if you try something radical and different, they can become more flustered and perturbed... boys are more relaxed and less worried. I have had to work consciously to generate challenge... girls accept my opinion too readily than I'd prefer... I would like them to be more questioning and forthcoming, offering opinions, especially on controversial areas".



Sometimes, this involved teachers offering explanations in a different language, or using different analogies, or using more confident girls to recall previous learning and offer feedback and guidance to others. On other occasions, teachers used humour, mock exasperation (“it’s easier than you think, you know... you could do this last week”) and informal language (“come on, you’re ripping me off... I know you know... *please tell me!*”) to demand more from the girls. Whatever the strategy, a range of strategies were used to respond to the learning needs of the girls, to establish secure and safe environments for learning. In the words of one Headteacher:

“Boys want it given to them straight, whereas girls need more assurance, more reiterative support to develop a sense of security, otherwise they may become invisible and crumble; it is easier to identify when boys are on-track whereas with girls, there is more of an inclination to hide, to be quiet; you need to direct questions more explicitly to girls”.

Equally, however, the teaching and learning environments in each school were far from cosy, easy-going, relaxed places. Whilst girls frequently asserted that they felt secure and supported in their learning, it was clear in their practices that teachers set out to challenge, to demand, to create learning contexts where girls could take risks and explore new ideas. So across all three schools, it was clear that teachers were alert to the need to confront girls, to get them to gamble, to take chances, to dare, to acknowledge comfortably that making mistakes and facing difficulties is integral to learning. This was clearly evident in this Headteacher’s response:

“Girls can be more compliant than boys, and so defer to strident voices and opinions. Girls need to be encouraged to take more risks, and in a single-sex environment, that is much more possible. Even so, this is an area of active challenge: in Maths Challenge, for example, girls are less willing to gamble than boys; higher level questions can ‘win’ higher marks but also lose more marks if they get the answer wrong; the challenge encourages risk-taking but girls are more reluctant to engage in it”.

In one school, this challenge had been tackled directly, through the introduction of a Critical Thinking course which had been formally introduced in Year 1 “to open our girls to new ways of thinking”. The course aimed to “encourage risk-taking, to draw girls out of comfort zones and areas where they are known to be strong and comfortable... pushing and challenging the girls to achieve more, to think more critically and analytically... in their approach to learning”.

The detail of these pedagogic practices is included here to reiterate these points. Two lessons were observed, both based around challenging and open-ended themes, on one occasion considering concepts of correlation and causation, and on another occasion discussing notions of reasonable doubt and balancing weight and quality of evidence in arriving at a reasoned judgement. On both occasions, the teacher adopted a brisk and forceful teaching style, with very interactive use of the IWB which was linked in throughout to the girls’ own handheld screens.

Questions were directed to individuals by name, and were demanding in their nature, requiring imaginative and lateral thinking, and repeated dialogue with the teacher and with each other. The teacher was generous in his use of humour, informality and praise to reassure, to challenge the girls, but also to demand that the girls think, hypothesise, reason and justify:

T: “B--- ... you’re on fire, go for it!” (laughter from others)

G: ‘I don’t know’...

T: ‘Yes, yes, you *do* know’...

G: “I’m thinking it might be rising temperature?”

T: ‘Yes, yes, I’m thinking you’re right... you’ve got it... well done’.







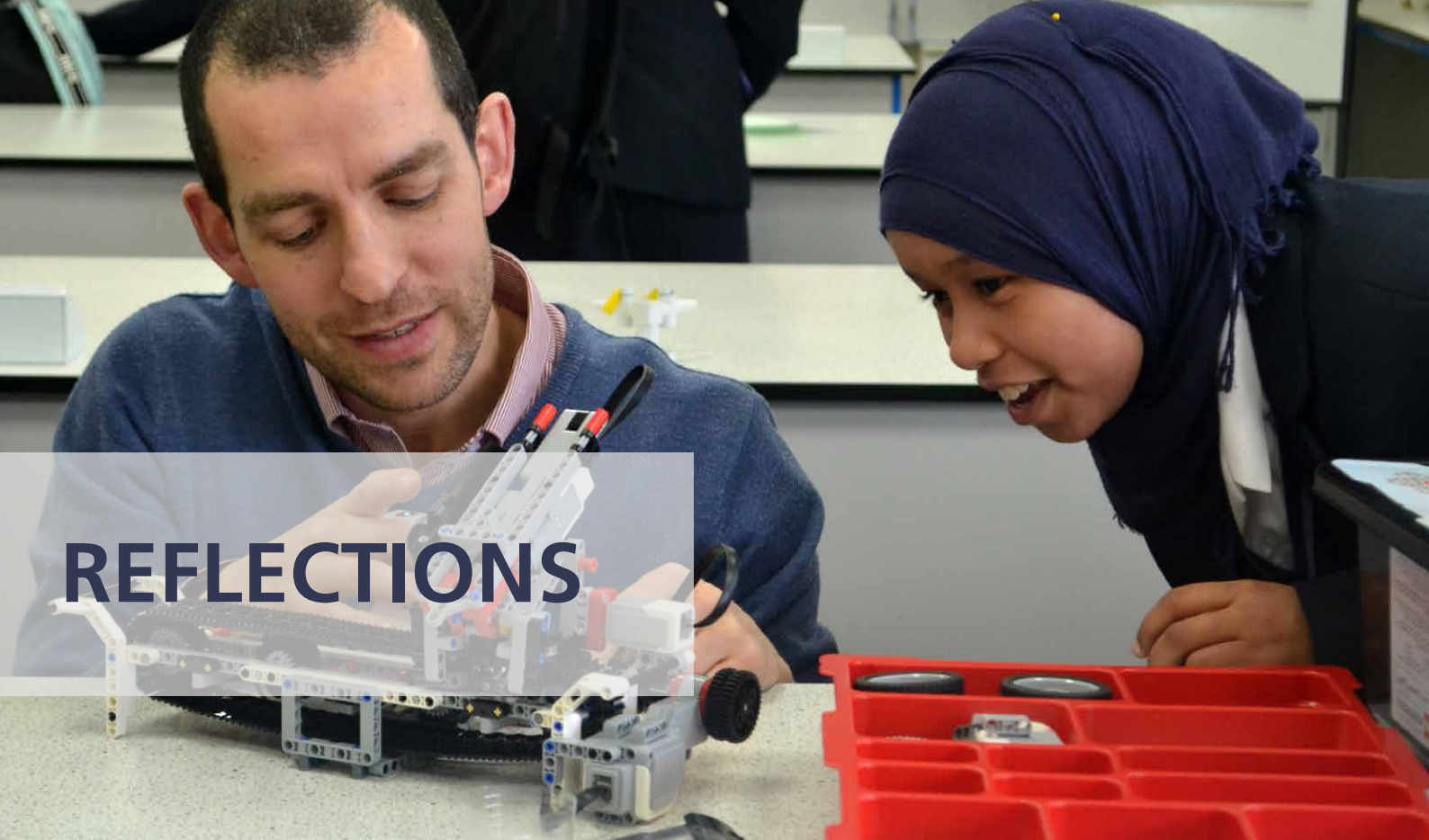
A few girls clearly found the pace of these lessons, and the insistent, robust questioning, somewhat daunting, but many girls interacted willingly and with enthusiasm, and engaged in rapid responses with the teacher in ways which created real momentum to the lesson. This use of humour and informality (such as encouraging girls to use the 'Churchill dog nod' to confirm their understanding to the teacher) created a context for risk-taking without loss of face (Gibbons, 2012), encouraged girls to move beyond their comfort zones and take chances, and reinforced learning points without the fear of threat or rebuke. These lessons were strongly teacher-led, depending crucially on the teacher's style of questioning and interactions with the girls; they were characterised by innovative and creative use of IT hardware and resources, but even more so by a robust demanding style of questioning and a very rapid pace and urgency to the lesson; on occasions, it appeared possible that some girls might find the style overawing and almost intimidating (perhaps even macho), but all responded well to the challenges presented by the teacher, and developed skills and attitudes which enabled them to think more analytically, and to develop a more profound sense of self-belief and self-esteem.

To reiterate, then: overall, most of the teachers interviewed who had taught in mixed or boys'-only environments did not feel that they were conscious of adopting a different teaching approach in their current, girls-only school:

"I have an active style, always on the go... demanding and challenging of pupils... quite dynamic and I expect them to participate fully... engagement and commitment... my style is irreverent to establish rapport... just the way I am. I didn't change my style when I came here, to teach only girls... the advantage is that there is order here... I teach exactly the same way as I have always taught... I would work the same way in a boys' school... there is no gender specificity in my teaching style; it is nothing to do with gender... being a man in a girls' school is not a relevant consideration". (Languages)

"I'm not sure I do anything differently here... you always respond to the situation you are in... I don't teach girls in a particular way... I get girls to take risks by demanding that they 'think, pair, share'... I give encouragement, convince them they have all the ideas and skills they need... but I did all this with boys, too". (Science)

It is worth noticing here, nonetheless, that in their discussions of pedagogy, teachers frequently made reference to what girls needed and to the attitudes and characteristics of girls: the need for security, patience, consistency and fairness, "a clearly set out routine", "a clear summary of the lesson and a coherent set of notes", "to develop a trusting relationship with the teacher", "encouragement to have a go and risk it". It is almost as though these characteristics of girls' learning are so 'taken-for granted', so assumed, that they were almost sub-conscious and latent.



There is a dilemma here, then, and a paradox. At one level, teachers' reflections suggested that they had not developed girls'-specific pedagogies, did not teach differently in a girls'-only classroom, or acknowledge that girls had different learning styles from those of boys. Classroom observations confirmed that a gender specific, girls'-orientated pedagogy was not explicit, and that – on the whole – classroom content and curricular focus was not gender specific. At the same time, however, teachers seemed to recognise that the girls they taught needed both more security and more challenge if they were to maximise their potential as learners. Whether this is gender-specific or not is arguable, since many boys of similar abilities need challenge and some of them certainly need more security than they might care to admit publicly. What seems unarguable, however, is that many of the observed teachers in these schools had adjusted their pedagogy, whether explicitly or implicitly, to context, to provide a secure environment for learning whilst at the same time building in challenges which increased girls' resilience and criticality.

These approaches are not necessarily gender-specific, then, but in these schools they are 'girl-friendly' because they recognise and acknowledge the learning needs of these girls, in order that their abilities and potentials be maximised. At times, this recognition is more implicit than explicit. In some lessons, girls were allowed more time and space for more prolonged activities, to allow them to develop ideas fully, and to allow them to respond to questions in a more considered, measured way, but the teacher "had always adopted this approach with girls". In another lesson, the teacher claimed she did not employ a distinctive style when teaching girls, but in the lesson debrief, acknowledged that "often girls cannot cope well with a style of lesson where there is constant movement from one activity to the next, with the emphasis on very short bursts, tight time limits, rapid pace... it creates anxiety and tension, and affects learning". These 'girl-friendly' approaches to the learning needs of girls were reiterated in discussion with the SLTs in each school:

"What is significant about girls' learning is that they need to be treated in a different way in the classroom compared to boys; within each group, there are many different learning styles but these are not gendered... strategies are needed to build up girls' confidence, to bring them out of themselves so that they participate more actively in lessons, to become more assertive and confident in the classrooms, to gain confidence in the power of their own voice".

"Girls are far more cooperative, more willing to listen, spend much more time thinking about what they are doing, produce super coursework. But if you are too direct with girls, it upsets them, performance suffers through time, and the feeling, the resentment against you, hangs on for some considerable time". (SHS)



What emerges here, then, in the practice and voices of the observed teachers is that the pedagogy which has developed - almost organically - within these schools, might not acknowledge that girls learn differently or have different learning styles to boys per se, but that teachers have developed and evolved a style of teaching and approaches to learning, sometimes almost sub-consciously, which has optimised the context of girls'-only classes. "The feel of the lessons is different... the way the girls act, the teachers interact, the rapport established between girls and teachers all have emerged through time... enabled by the single-sex environment", and that practice has become implicit, based on experiences and on "what works, when, with whom":

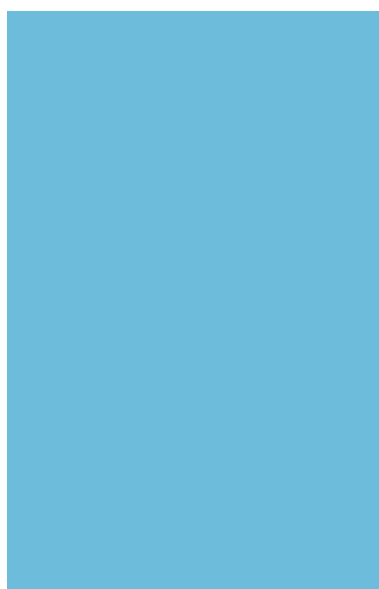
"Boys are more robust, will take the knocks more readily and then get up and get on with it... girls lose self-confidence more easily, quickly and regain it less quickly".

"We want to encourage and sustain girls' desire for neatness, order and careful thought, but at a certain point, this is also a great weakness... present them with an open question and this can lead to complete meltdown, they cannot cope... so we need to encourage them to experiment, have a go, be brave, not be worried about meticulous detail... be more robust".

"They learnt (in a project with a neighbouring boys' school) that the boys were more immature, more irresponsible in working collaboratively, but also that boys will go for jugular, are more ruthless and straight talking in how they operate... the girls learnt to be a little more direct, more challenging, more confrontational themselves".

All of this discussion, of course, has to come accompanied with warnings about the dangers of generalisations and stereotyping, about not ignoring boys and girls who do not fit these apparent norms, who behave as 'others' in their attitudes to sport, dance, poetry, dress, attitudes, and the dangers of assuming an essentialist argument. Nonetheless, whilst it seems to be generally accepted across the three schools that girls and boys do not have distinctly different learning styles and that the teachers in these schools do not consciously teach in gender-specific ways, over time they have adapted their teaching styles to accommodate and respond to the learning needs of girls, in girl-friendly ways. This involves creating places for learning which are secure but also challenging, which place emphasis on collaborative learning rather than generating an overtly competitive environment, which stress interactive and cooperative modes of learning, and which encourage girls to work together on an issue or a problem, rather than in isolation. Crucially, however, there is no paradox in accepting that such approaches might also be boy-friendly; it is simply that the teachers in these schools have, over time, through professional practice and discussion, evolved pedagogic strategies that cater better for the learning of girls in these schools.

This analysis of these classroom observations suggest, then, that some teachers have evolved an organically different teaching style in girls'-only classes, which recognises the need on occasions to give girls space to reflect, consider and develop answers and responses, to challenge girls to risk more willingly, to encourage them to be more assertive and robust, and to demand that they think outside the box. But there is a dilemma here: if these strategies have evolved organically, developing implicitly through time rather than being made explicit, if the teaching styles are embedded within the schools' culture and enabled by the single-sex environment, then there is a significant challenge in making these strategies and styles explicit, transparent to all staff, to ensure that the advantages of context are maximised.



Notwithstanding the view expressed in some schools that the advantages of the single-sex setting are self-evident (“the advantage is here, in the environment and the context”), it is worth being explicit about the adaptation of teaching styles and implementation of teaching-learning strategies which maximise the advantages offered by a girls'-only environment; both because they are acknowledged to be implicit and because, as the girls' voices show, not all teachers have bought into this style of teaching. The need for effective and explicit staff development is therefore crucial.

Two final points, then:

Classroom observations in these three schools and interviews with the observed teachers suggest that the teachers do not explicitly teach in ways which acknowledge that girls and boys have distinctly different learning styles, which must be accommodated by gender-specific teaching strategies. Nonetheless, it is evident in their practices that over time their teaching styles have evolved to accommodate and respond to the perceived learning needs of girls in these schools, in ways which may be described as girl-friendly. There is no paradox or mismatch in this. Significantly, too, many of the features of teaching and learning identified here from current research - individual difference, praise of effort, collaborative learning, dialogic teaching, exploratory talk, effective groupwork - are an integral part of the pedagogic practices of many of these teachers in the three schools, adapted for context and used effectively to support and enhance girls' learning.



Equally, however, student (or pupil) learning is not simply a matter of what happens in the classroom but depends on, and is closely related to, professional learning. How can pupils learn well if their teachers do not see themselves as learners or are not continuously open to extending and challenging their work? How can teachers learn well if the school is not a learning organisation, a place which is constantly challenging itself to do better and extending the skills of all its members? Many aspects of these three GDST schools suggest that they are indeed professional learning communities, where school leadership and classroom teaching has evolved to maximise advantages of the single-sex environment, and to optimise girls' achievements and attainment. Freed to some degree from government dictat by their independent status, and with the confidence generated by being members of a supportive community, these GDST schools have been enabled to replace the pedagogy of official recipe by pedagogies of repertoire, evidence and principle: 'Children will not learn to think for themselves if their teachers are expected merely to do as they are told'. (Cambridge Primary Review, Alexander et al, 2009).







# IMPLICATIONS FOR PRACTICE

In attempting a review of the research, it is important at this stage to reiterate the dangers of generalisation and stereotyping: self-evidently, not all girls are the same, and to assume so creates an essentialist argument which will be self-defeating if the aim is to maximise the potential of all girls. Nor is it obvious that all girls have a learning style which is markedly different to that of boys. But the weight of the research does suggest that many teachers have evolved – over time, and frequently sub-consciously – an approach to girls' learning which is girl-friendly. In these circumstances, effective pedagogy is characterised by:

- **Lessons which have a clearly visible structure, with a clear direction and helpful prompts, all articulated to the pupils in language with which they can identify;**
- **A high level of involvement and interactivity, a focus on talk, and a willingness of the teacher to create a collaborative learning environment, listening carefully to pupils' questions and difficulties;**
- **An acknowledgement that interactivity does not always mean frenzied activity and variety, because of the need for space and time to complete tasks properly; appropriate pace for context is the essence;**
- **The creation of a sense of confidence and security for the learners, so that girls are willing to learn from each other, to take risks and explore, testing their powers of reasoning against and with other girls;**
- **Teachers' ability to challenge, to demand more, to offer explanations in different ways, to involve girls in teaching each other;**
- **The development of a collaborative partnership between learners and teacher, fostering independent learning but within a secure and challenging environment;**
- **An awareness that however confident girls appear, teachers need to take time and space to reassure, to reiterate, to clarify, even when girls seem less confident in their own abilities than they ought to be.**

The emphasis on confident learners is crucial here, since the recent OECD report (OECD, 2015) on continuing gender disparities in achievement is clear in asserting that gender disparities in performance do not stem from innate differences in aptitude, but rather from students' attitudes towards learning and their behaviour in school and from the confidence they have – or do not have – in their own abilities as students. Thus confidence appears to be one of the strongest factors affecting the evident disparity found in PISA tests – where high-performing fifteen-year-old girls still under-achieve in Mathematics, Science and problem-solving when compared with high-performing boys (OECD, 2015). But equally, if there is another essential and complementary message to emerge from this review of research, it concerns resilient learners: although girls frequently asserted that they felt secure and supported in their learning, it was evident from teachers' practices that they also set out to challenge, to demand, to create learning contexts where girls could take risks and explore new ideas.

Teachers were alert to the need to confront girls, to get them to gamble, to take chances, to dare, to acknowledge comfortably that making mistakes and facing difficulties is integral to learning. Teachers in these contexts encouraged girls to take risks, brought them out of comfort zones, and required and enabled them to think more critically and analytically in their approach to learning. So effective pedagogies for girls require teachers not only to create stable, secure and enabling environments, but – once these learning environments are established - to enable girls to become more assertive and robust in their approaches to learning, to demand that they think outside the box and to become more resilient, confident and self-assured learners.



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