Members of Loughborough University, Coventry University and De Montfort University founded the Dyscalculia and Dyslexia Interest Group (DDIG) in February 2003. Led by Clare Trott at Loughborough, it aims to raise awareness about, and investigate links between, dyscalculia, dyslexia, mathematics phobia and the study of mathematics in the Higher Education (HE) sector. It offers a forum for the discussion of ideas and the linking of research and practice. Since 2003 two events have been held each year in addition to a one-day conference in 2005.

Background to this event

Previous DDIG workshops have tended to focus on struggling students and the difficulties arising from their dyslexia, dyscalculia or anxieties. The idea which underpinned this event was to focus on the experiences and achievements of successful mathematicians and scientists. This half-day event was held at the University of Birmingham on Wednesday 7th December 2005 and attracted 48 delegates. It centred on the personal perspectives of three dyslexic individuals who are now lecturing or researching in UK universities, and was followed by group discussions to explore the way these experiences can inform the support provided for mathematics and science based students in HE.

The event

Delegates heard the speakers’ personal experiences of growing up with dyslexia, their interactions with various parts of the education system and the particular challenges that were encountered. It was from these fascinating first-hand accounts that the delegates were given an insight into what it is like to be bright, capable and ambitious, but have to overcome obstacles erected by the educational system. Many interesting points emerged from the three talks, some of which were experienced by all three speakers, and others were unique to a particular individual.

The presentations were followed by group discussions on the personal perspectives given by the three speakers. Three pre-determined questions were discussed by the groups:

- What are the commonalities / similarities in the personal perspectives?
- How might appropriate support have helped?
- How might an institution adapt to students’ needs, in the light of the accounts heard?

The ideas put forward by the groups were then displayed as posters whilst the delegates enjoyed a buffet and an opportunity to reflect on the observations and ideas generated.

Presentations

Some interesting and key points emerged from the presentations. The three speakers openly described their individual experiences from an early age through into their professional careers, and all were unique and quite
different. However they all talked about the difficulties they faced, the strengths they felt they possessed, the strategies they had personally developed to cope, and the strategies they thought teaching staff and institutions could put in place that would help dyslexic students.

Two of the speakers spoke candidly about how they had been labelled as below average at some point in their lives, being placed in bottom sets at school, sometimes failing to convince teachers or parents of the abilities they possessed and because of this being assigned ‘lesser’ tasks. The other showed how her position in her family meant that her education was not monitored seriously. She didn’t know she had a problem until, whilst auditioning for a 6th form school play, she was told: ‘we know you can’t read, so learn a speech’. The severity of reading difficulties varied, with one of the speakers managing to overcome early problems through substantial practice. However, another still has significant problems with words and noted in particular how time consuming it can be to mark student scripts (and for which no additional time is allowed!).

As with reading and writing, the levels of severity of difficulties with mental arithmetic, sequencing, and orders of magnitude varied widely. One speaker noted that whilst mathematics is not a problem, arithmetic certainly is. “Subtraction is particularly unsafe; I never attempt to do mental arithmetic”. All the speakers explained how problems have a wide impact on daily life and not just academic life, for example, “I arrive for appointments at departure times”, components of spoken telephone numbers such as ‘treble three’, or ‘double two’ cause particular difficulty.

A central, common theme was that all speakers had individual, and often highly-developed strengths. Frequently, these were practical and included expertise in glass-blowing, drawing, and making machines. They included skills in computer programming and map-reading. All spoke about their ability to invent their own strategies and solutions to problems. One was meticulous about observing detail and recording information, skills which turned out to be invaluable in a scientific career. They strongly believed that dyslexic students do have individual, and often highly-developed strengths.

All had developed strategies that had enabled them to move forward into successful academic careers. Two of the speakers spoke about a person in particular who had ‘believed in them’ and had been instrumental in helping them succeed. One noted that at University, his tutor ‘didn’t believe in dyslexia’ but nevertheless recognised his difficulties and suggested they find ways to work around the problems experienced. Another noted that without a diary it would be impossible to function.

Institutional strategies for supporting students should recognise that there are many alternatives to using words to transfer information and that different students’ learning styles should be acknowledged. For example, where possible, equations, graphs, experiments, photographs, diagrams, demonstrations etc. should be included in the portfolio of teaching methods used. There was a common opinion that too many allowances can discredit achievement and students would be better taught coping strategies. There was no fondness for labelling students with specific learning difficulties, but all recognised the need to do so if support and funding for this was to be forthcoming.

Key points from the posters

Question 1. What are the commonalities/similarities in the personal perspectives?

Whilst they were not understood during their schooling and pushed towards a ‘practical’ career, the speakers all had an inner belief in their ability and succeeded in spite of a system that judged them on their literacy skills. They experienced difficulty if they were interrupted whilst working, had problems with the concept of time and found that mathematics embedded in words was not user friendly. They needed to understand ‘why’ before their learning process could begin. All had succeeded despite being placed in the bottom sets or otherwise not encouraged.

Positive aspects of being a dyslexic mathematician/scientist included having an imaginative, visual and logical understanding combined with practical skills. It is important to focus on these strengths and to consider dyslexia in a positive way. The negative aspects encountered were difficulties with numeracy, mental arithmetic, reading and writing.

All recognised the need for a label to enable access to support, which may include alternative approaches being used or extra time in examinations but were concerned that too many allowances may devalue achievement.

Question 2. How might appropriate support have helped?

It was advocated that early diagnosis and appropriate support is helpful. Teachers should receive more training, be aware that individuals learn differently and use more than one way of delivering material if and when required. Additionally it was felt that there should
be more flexibility in assessment procedures. Students should be encouraged to become independent learners and their views should also be sought regarding the structuring of support sessions.

An open-minded professional approach was considered to be of great value. This includes recognition of individual strengths and listening to what the students are saying.

**Question 3.** How might an institution adapt to students’ needs, in the light of the accounts heard?

We have divided the information from the posters into three areas: general support, assessment and examinations and common problems and strategies.

**(i) General Support:** Additional support should be provided to assist at the transition to HE stage. Preparatory material could be sent to all students prior to their commencing HE and this could include a glossary of subject specific vocabulary.

Academic staff should have a clear understanding of what dyslexia is. This could be achieved by presenting case studies or by asking a cohort of students at the end of their first year of study for advice to give to new students and this could be forwarded to academic staff. Staff would then gain an understanding of what difficulties are faced by dyslexic students and have realistic expectations regarding, for example, the length of time taken by dyslexic students to read text books, notes and articles. There is also a need for the provision of model answers to problems, specific but positive feedback and flexibility of teaching methods, including visual and practical aspects.

Institutions should use accessible fonts wherever possible and explain what can and cannot be changed. Some dyslexic students can do higher-level mathematics but struggle with arithmetic and so for these, access to a calculator is helpful. If mathematics support is required it should be available in an analogous way to that which is provided for study support and language support. However, unlike study support and language support, which do not require subject specific knowledge, it needs to be delivered by a competent mathematician who, additionally, has some knowledge and understanding of dyslexia. Competitiveness amongst individuals does not help dyslexic students.

**(ii) Assessment and examinations:** The provision of extra time in examinations may contribute to over-tiredness in addition to devaluing achievement. Consideration should be given to providing alternative assessments such as increased coursework, continuous assessment or viva. Other suggestions included: making use of computers in examinations and changing the layout of examination papers. For example, relevant formulae and tables could be included next to each question.

**(iii) Common problems and strategies:** Common problems included learning formulae, concentration spans and concepts of time. Strategies may involve devising checks to determine if a formula has been correctly remembered and finding a special or quiet place in which to work. The issue of whether or not formulae booklets should be provided was felt to be dependent on the purpose of the examination.

**Future events**

Following the successful conference held in April 2005, DDIG held another one-day conference, ‘Forging the Future’ on Wednesday 5th April 2006 at Loughborough University. This had a focus on the field of dyscalculia, dyslexia and mathematics in HE. There were presentations and smaller parallel group sessions providing opportunity for discussion. Further details may be found on http://ddig.lboro.ac.uk.

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