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# A bio-psychosocial and ecological model of service delivery for college students with Developmental Coordination Disorder (DCD)

## Introduction

The purpose of this article is to raise awareness and understanding of the growing numbers of students with Developmental Coordination Disorder (DCD) presenting at third-level, along with the challenges they face, and how they may be supported. An example of an educational psychological service that adopts a biopsychosocial and ecological approach will be discussed, recognising that student well-being is intertwined with academic experiences.

## What is Developmental Coordination Disorder?

Developmental Coordination Disorder (DCD), also known as Dyspraxia, is a common neurodevelopmental disorder affecting motor coordination (APA, 2013). It also affects other areas of functioning such as executive functioning and social and emotional well-being (Wilson et al., 2017).

In Ireland and the UK many people refer to these difficulties as dyspraxia. It can be confusing for many people as to what the different labels mean. To explain dyspraxia, praxis is a product of normal motor learning, and is fundamental to a person acting on the environment. Praxis is necessary for being able to perform everyday tasks such as getting dressed, writing, walking, driving etc. Dys/praxia then is a difficulty executing these activities or tasks. Individuals with dyspraxia also have a difficulty planning, conceptualising and organising information and activities. DCD is generally the term that is most widely used internationally and is the label that is referred to in the Diagnostic Statistical Manual 5th Edition (DSM-V) by the American Psychiatric Association (APA, 2013). DCD encompasses all the difficulties associated with the term dyspraxia but also includes difficulties with balance, coordination, and bilateral integration. In 1994, those contributing to the creation of the DSM-IV agreed to use the term Developmental Coordination Disorder (Gibbs et al., 2007).

## How is DCD diagnosed?

In 2013, the diagnostic criteria were further refined with the publication of the DSM-5. The DSM-5 classifies DCD as a discrete motor disorder under the broader heading of neurodevelopmental disorders, and outlines the criteria for a diagnosis of DCD as follows:

- Acquisition and execution of coordinated motor skills are below what would be expected at a given chronological age and opportunity for skill learning and use; difficulties are manifested as clumsiness (eg, dropping or bumping into objects) and as slowness and inaccuracy of performance of motor skills (eg, catching an object, using scissors or cutlery, handwriting, riding a bike, or participating in sports)
- The motor skills deficit significantly or persistently interferes with activities of daily living appropriate to the chronological age (e.g., self-care and self-maintenance) and impacts academic/school productivity, pre-vocational and vocational activities, leisure, and play

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- The onset of symptoms is in the early developmental period
  - The motor skills deficits cannot be better explained by intellectual disability or visual impairment and are not attributable to a neurological condition affecting movement (e.g., cerebral palsy, muscular dystrophy, or a degenerative disorder)

## Prevalence

Wright and Sugden (1996) found that the prevalence figure was 4-5% in mainstream primary schools. The APA (2000) suggests a figure of around 6% for the age range 5-11 years. The general consensus in relation to gender differences is that the condition is more prevalent in boys than girls, with estimates ranging from a small difference to three or four to one (Kirby & Sugden, 2007). The numbers of students with a diagnosis of DCD entering third-level education in Ireland has increased significantly in the past 5 years. The total number of students with disabilities in Higher Education Institutions (HEI's) in Ireland in 2012/13 was 9,082 and 2.8% had DCD, which is 254 students (AHEAD, 2013). The total number of students with disabilities in HEI's in Ireland in 2016/17 was 12,630 and 6.1% had DCD, which is 770 students (AHEAD, 2018). There has been little research conducted in Ireland in relation to the needs and experiences of third level students with DCD. Often college staff do not have any specific training or knowledge of DCD and the types of challenges and barriers that the students face.

## What are some of the challenges for college students?

DCD can affect some or all of some of the following areas and can vary in severity from one person to another:

- Fine motor difficulties can result in individuals having significant handwriting difficulties. They may also have difficulty using cutlery, cleaning, cooking, carrying out craft work, playing musical instruments, using tools and domestic implements, using locks and keys, dressing and grooming, and the person may have poorly established hand dominance.
- Gross motor difficulties include issues with balance and posture and individuals with DCD may tire more quickly than their peers carrying out the same activities. They often have difficulty with sports, particularly team sports - especially those involving catching or hitting a ball. Adults often report having significant difficulty learning to drive and report having to re-sit their driving test several times without success.
- Many individuals with DCD present with low or poor muscle tone. They have poor strength, poor endurance and have difficulty controlling limbs as they are often very flexible. People with DCD can come across to others as being very awkward. They may slouch in their chair which is commonly perceived to others, especially teaching staff, as being lazy, and 'not bothered'.
- Individuals with DCD often present with bilateral integration difficulties, which means that they may have difficulty carrying out tasks or activities that involve using both hands (and thus both sides of the brain) at the same time. For example, when cutting with a scissors, one hand is required for completing the activity and the other for stabilisation. Another example of this is the basic everyday skill of handwriting. For people with DCD this task never becomes automatic and the individual may often continuously struggle with the task.
- It is common for people with DCD to experience significant visual perceptual difficulties. Visual perception refers to the brain's ability to make sense of what the eyes see. In practical terms what this may mean is that individuals have difficulty following text on a page smoothly with their eyes. There may be a tendency to lose their place on the page while reading. It has also been observed that individuals with DCD find it difficult to look quickly and effectively from one object to another, for example when taking notes from a

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screen or whiteboard.

- Difficulty with spatial relationships can result in bumping into and tripping over things and, dropping and spilling things. A person may have difficulty with sense of time, speed, distance or weight, poor sense of direction, and difficulty distinguishing right from left.
- Often individuals with DCD experience social interaction difficulties. For example, they may have difficulty listening to people especially in groups, or difficulty reading non-verbal signals. They may interpret information very literally, and have difficulty adapting to new and unpredictable situations. They may have poor body image resulting in low self-esteem. Children with DCD are often not involved in team sports, as they tend to have a lot of difficulty with ball skills. This is very unfortunate as these are the primary ways that children learn social rules and develop good social skills. It is not surprising then when these children present as young adults, they have very poor self-esteem and confidence. People with DCD are usually very sociable and seek social interaction and friendships with their peers but because of the social awkwardness described above and the lack of awareness in relation to social cues and boundaries, they may often have difficulty maintaining close friendships.
- Sometimes people with DCD have speech and language difficulties. They may talk continuously with constant repetition, and may have difficulty organising the content and sequence of their language. They may have articulation difficulties, where speech may have uncontrolled pitch, volume and rate.
- People with DCD often display unusual reactions to sensory experiences. They may be described by an Occupational Therapist as hyposensitive (under-sensitive to stimuli and difficulty processing information through the senses), hypersensitive (extreme physical sensitivity to particular substances or conditions), or a mixture of both. The most common sensory problems include: visual, auditory, tactile, olfactory, and oral. It is not surprising then that sensory sensitivity can cause significant difficulty for people in everyday life.

Kirby et al. (2011) report that between 30-70% of children diagnosed with DCD in childhood maintain difficulties in daily functioning into adulthood. In light of all the difficulties outlined above, it is clear why transitioning to third-level can be a significant challenge for students with DCD. They have to learn new skills, such as learning to live away from home, manage themselves and their personal hygiene, plan and cook meals, manage finance, get involved in social activities, get to lectures on time, and take notes in class. They have to find their way around new places, manage college course work, assignment deadlines, and sometimes part-time work as well.

## Overlapping difficulties / comorbidity

It is important to mention that many students who present with DCD at third-level report that they also have dyslexia, ADHD, autism, or a mental health difficulty, such as anxiety or depression. Kirby et al. (2008) describe a cohort of 93 UK students studying at further or higher education and who reported motor difficulties present since childhood. In their study, 21 students reported that they had DCD only, 38 students with DCD plus another diagnosis (a combination of any of the following: dyslexia, attention deficit hyperactivity disorder (ADHD), autism spectrum disorder (ASD)); 23 students reported dyslexia only, and 11 students reported that they had never been formally diagnosed. In relation to mental health difficulties, Hill & Brown (2013) found that adults with DCD experience higher rates of anxiety, depression, and mood disorders than their typical peers. In a study by Kaplan et al. (1998) into whether or not DCD is a discrete disorder, they referred to the fact that 'pure' DCD or 'pure' ADHD appears to be hard to find, indicating again that overlap is the rule rather than the exception.

## Strengths

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When interviewed by the Irish Times, an adult with DCD stated the following,

It is down to the way the brain processes information – it ‘takes the scenic route’.

This was reported in an Irish Times article about dyspraxia in October 2016. All individuals have strengths and challenges and some have more significant challenges, like those with DCD. It is important to empower individuals by guiding them to identify their own profile of strengths and challenges so that they can use their strengths to overcome the barriers they face in everyday life. Due to the many complex experiences and situations that people with DCD find themselves in, they often build up very good resilience and become very well able to respond well in difficult situations. They can be very creative because they have always had to find alternative ways to overcome their difficulties. It is important to focus on what students can do instead of always looking at what they can't do. Many individuals with DCD are very successful in education and have successful careers. Examples include Daniel Radcliffe, actor who plays the well-known character of Harry Potter, and Florence Welch, singer from Florence and the Machine.

## A Universal Design for Learning (UDL) Framework

This strengths-based approach in relation to students with DCD can be further supported in the context of a Universal Design for Learning (UDL) approach to education. UDL is a set of principles that gives all individuals, including those with DCD equal opportunities to learn. In any college setting, or in any one classroom or lecture theatre, teachers and lecturers will meet with a diverse group of learners including students from different cultural backgrounds, students with disabilities, mature students, international students, and students who come from different socioeconomic backgrounds. UDL is an educational framework based on research from the fields of neuroscience, education, and psychology that guides the design of learning goals, materials, methods, and assessment. It can also guide how learning policies are written, taking into account student diversity (AHEAD, 2018).

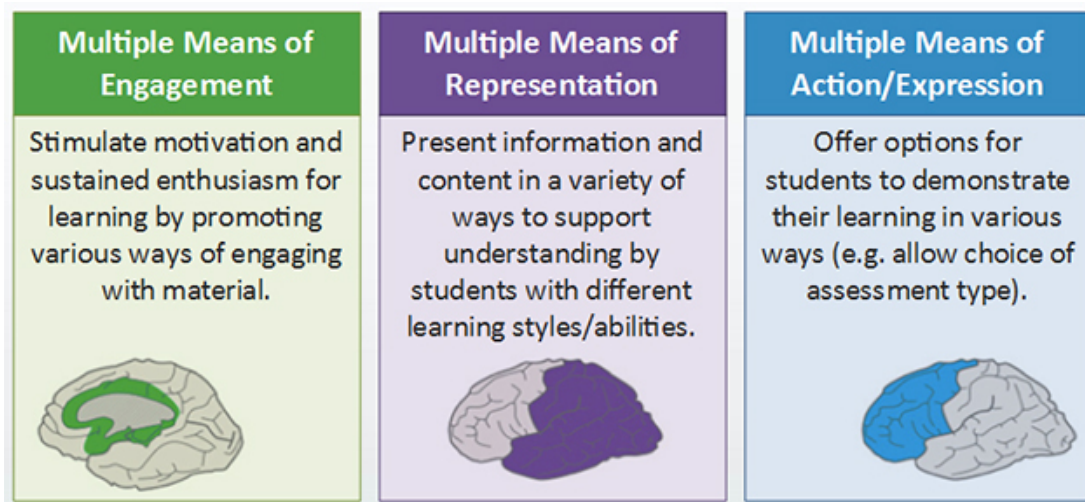
Using a UDL framework at third level means that students can be supported and guided in gaining the necessary knowledge, skills and enthusiasm for learning. Every learner is unique and one size does not fit all. So, how can a curriculum be designed in a way that it challenges and engages diverse learners? Firstly, learning goals need to be established at the outset, and then the learning barriers for students reaching these goals needs to be identified. To eliminate the barriers, the three principles of UDL can be adopted to create flexible pathways to learning to allow students to progress (CAST, 2018).

The 3 core principles that should be embedded in teaching practice are:

1. Multiple Means of Representation – where content and information should be presented in multiple media, graphics and animation, critical features should be highlighted, background knowledge activated, and new vocabulary supported.
2. Multiple Means of Action & Expression – there should be lots of options for students to express themselves. Models, feedback and support for different levels of proficiency should be provided
3. Multiple Means of Engagement – teaching practice should give choices to students to fuel interests and

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autonomy in learning. Students should be encouraged to take risks, make mistakes, and learn from their mistakes. When students enjoy learning they are more likely to persist through challenges.



Research suggests that students are best supported in educational institutions that adopt this UDL model. Al-Azawei et al. (2017) refer to a number of different studies that have shown that UDL application in higher education can promote learner experience in terms of performance, engagement, satisfaction, social presence, learning stress, and learning flexibility.

## The National Learning Network (Rehab Group) Educational Psychological Services at Higher Education

A functional and practical approach to supporting all students (including those with DCD) is the predominant feature of the NLN service. The team of educational psychologists at the service use an integrated research and practice model of service delivery. The service is client centred and solution focused and draws from a range of evidence based educational and psychological theories such as behaviourism and cognitivism in order to support students. These theoretical models are used when working collaboratively with students in setting goals and designing strategies for intervention, while at the same time supporting emotional health and well-being. It is a one-stop shop with a multi-modal approach that supports the biopsychosocial and ecological needs of all individuals. The biopsychosocial approach looks at the interactions between biological factors (genetic, biochemical), [psychological factors](#) (mood, personality, behaviour), and [social factors](#) (cultural, familial, socioeconomic, medical). It is important to consider all three areas when supporting individual's needs. It is also very important to examine the individual's needs in the context of their environment, for example family, education, work and social setting, and cultural contexts (ecological approach).

The NLN education psychology team understand how physical disability, mental ill-health or clinical disorders impact upon the social development, well-being and academic performance of students. An understanding of human behaviour from a psychological perspective allows staff to help students retrain the maladaptive strategies that they have developed such as poor timekeeping, organisational difficulties and low motivation which prevent them achieving their full potential, and ensure that students are managing thoughts, feelings and beliefs about their academic lives effectively.

[Types of supports students choose to receive](#)

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## Study Support Sessions

- Developing metacognition skills (teaching students to think about how they learn);
- Exam Revision and Strategy;
- Critical Thinking;
- Memory Techniques;
- Note Taking and Note Making;
- Active Learning;
- Essay Writing;
- Active Reading;
- Mind-Mapping.

## Wellness Support Sessions

- Self-Esteem and Confidence;
- Developing a Wellness Toolbox;
- Healthy Lifestyle;
- Relaxation Strategies;
- Managing Negative Thoughts;
- Managing Anxiety;
- Stress Management;
- Motivation;
- Goal-Setting.

## Social Support Sessions

- Reading Other People;
- Building Friendships;
- Maintaining Appearance;
- Assertiveness;
- Self-Advocacy.

## Managing Activities of Daily Living

- Personalized Timetabling
- Living Away from Home
- Managing Money & Budgeting

Students are supported by designing individualised and goal-orientated support programmes targeting each area that the student wishes to improve. Students can access a range of study, wellness, social and organisational support sessions. NLN's Educational Psychology Service strives to promote students' independence, encouraging development of the skills necessary to help self-manage and self-regulate their difficulties. This approach empowers students to flourish during their time in college and onwards into employment.



Prepare students for post college

Skill development

Empowerment

Self-manage difficulties

Promote students' independence

Academic achievement

## Conclusion and Recommendations

The numbers of students with DCD in Irish HEI's makes up a considerable proportion of all students with disabilities. 6.1% (770 students) have DCD (AHEAD, 2018). Despite growing numbers there is a lack of awareness of the needs and experiences of students with DCD at third-level. The transition to third-level is a significant challenge for students with DCD, and they may also have co-occurring difficulties such as dyslexia, ADHD, autism, or a mental health difficulty. Despite the number of significant challenges that adults with DCD face, it is important to remember that all individuals have a vast range of strengths, and they should be empowered to identify and use these strengths to overcome the barriers they face in everyday life. Many individuals with DCD, if supported appropriately, can of course be very successful in education and have successful careers.

An example of a support model for students with disabilities including those with DCD was discussed in this article. It described a functional and practical approach that the National Learning Network service adopts. The service is client centred and solution focused and draws from a range of evidence based educational and psychological theories. These theoretical models are used when working collaboratively with students in setting goals and designing strategies for intervention, while at the same time supporting emotional health and well-being.

Supporting students with DCD at college is also the responsibility of all staff on a college campus – a whole college approach. However, it is an area that is still very much a 'hidden' disability. If staff are more aware of the challenges faced by students with DCD, then they can encourage students to seek appropriate support and help at the beginning of the academic year before the workload begins to build up and the experience for students becomes overwhelming. More research is required in the Irish context in relation to the lived experiences of third-level students with DCD in order to inform service delivery. Academic staff need to be provided with opportunities for attending awareness sessions on DCD (along with other disabilities) and how they can support and understand these students better within a classroom environment through a Universal Design for Learning approach.

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Suzanne has worked with the Rehab Group / NLN since 2003. She works in close partnership with a number of Higher Education Institutions (HEI's), developing academic and well-being support services for students with learning, mental health, physical, and sensory disabilities. Suzanne develops protocols and procedures for supporting students with disabilities in conjunction with their respective learning provider. Suzanne has implemented incoming student screening models to validate early identification of learning support requirements for learners. She has assisted third-level institutions implement tailored universally designed learning services with positive measurable outcomes. She also delivers Continuous Professional Development (CPD) training to third-level staff, regularly presents research papers, and delivers guest lectures to post graduate education students in a number of different HEI's. (B.A. Psych, HDip Ed., MA Professional Ed. Psych (PSI))

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