



Treball Final de Grau

**High education for students with special educational needs
Docència universitària: adaptacions a casos particulars**

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Començaré amb un agraïment, tan sincer com pot ser-ho, a la meva tutora, la Rosa. Per la dedicació, l'empenta i la perseverança. Perquè estic segura que sense la seva voluntat i el seu temps, aquest treball, en la meva situació personal, no l'hagués pogut finalitzar. Gràcies per la lluita cap a un ensenyament inclusiu.

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REPORT

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1. SUMMARY

Diversity has become an intrinsic part of society and, therefore, also of education. This bibliographic work presents some of the adaptations and supports offered to students with disabilities or mental health disorders during their time at university, since the difficulties these students face when pursuing higher education still represent a major barrier.

The analysis of student services addressed to students with special educational needs at universities in different geographic areas evidence that there is a steady progress towards more inclusive universities. Based on this research, a comparative study has been carried out among six universities (European, Anglo-Saxon and North American) in order to detect the strengths and weaknesses of the Inclusion Program of the Faculty of Chemistry of the UB. This program is intended to serve as a guide for other faculties of the University of Barcelona.

Keywords: chemistry teaching, special educational needs; learning and assessments adaptations; high education, Faculty of Chemistry

2. RESUM

La diversitat ha passat a ser una part intrínseca de la societat i, per tant, també de l'educació. Aquest treball presenta algunes de les adaptacions i suports que s'ofereixen a estudiants amb discapacitats o trastorns mentals durant el seu període universitari, ja que les dificultats amb què es troben aquestes estudiants en cursar estudis superiors encara representen un important obstacle.

L'anàlisi dels serveis d'atenció a l'estudiant adreçats a estudiants amb necessitats educatives especials d'universitats de diferents àrees geogràfiques fa evident la trajectòria que s'està fent cap a unes universitats inclusives. A partir d'aquesta anàlisi, s'ha realitzat un estudi comparatiu entre sis universitats (europees, anglosaxones i nord-americanes) per tal de detectar els punts forts i els punts febles del Programa d'Inclusió de la Facultat de Química de la UB. Aquest programa pretén servir de guia per a altres facultats de la Universitat de Barcelona.

Paraules clau: ensenyament de la química, necessitats educatives especials, adaptacions d'exàmens, estudis universitaris, Facultat de Química

3. INTRODUCTION

In a society where inclusion and diversity are in the order of the day, university institutions as learning and development spaces have integrated, for the most part, inclusion programs in their respective student services. In order to guarantee universality and equal opportunities, a wide variety of models of action have been adopted, depending on specific conditions and concrete situations. These models of action, oriented to comply with the purposes of an inclusive university, are very varied and are conditioned by the socioeconomic, cultural and geographical context of each institution. Thus, the assessment of their effectiveness and good functioning must include an analysis in different areas.

In this work we will study the services provided to students with specific educational needs (SEN) of the inclusion programs in force in Anglo-Saxon, American and European universities to observe the measures adopted by each of them and to analyze how they can be implemented or adapted to the Faculty of Chemistry of University of Barcelona (UB). The standardization of an effective and complete inclusion program in the Faculty of Chemistry aims to establish a model that can be adapted later to other faculties of the university, depending on the curricular characteristics and methods used in each of the academic areas.

In the following sections we will briefly introduce what we mean when we talk about SEN and what is the current situation in Catalonia and in the Faculty of Chemistry of the UB regarding the inclusion of people with SEN in the university education system.

3.1. SOCIETY AND INCLUSION IN THE EDUCATIONAL SYSTEM

From compulsory education to higher education, the educational system changes and progresses, adapting to the needs of society and creating new realities. It is, therefore, essential that educational institutions orient their practices towards equal opportunities for all people. As Enriqueta Expósito¹ (professor of constitutional law at the University of Barcelona) puts it, "it is a matter of achieving an inclusive university that adapts to a reality in which diversity exists" (2017, 9). Going to university brings challenges to all people and, when these challenges are added to other difficulties that our system generates, it becomes essential to minimize them, as

far as possible, to ensure a real and effective inclusion. More and more people with disabilities or specific educational needs are deciding to access university studies². This fact must be accompanied -and must continue to be accompanied- by implementing and improving student care services, complemented in many cases by specific programs of attention to diversity.

Inclusion programs that have been implemented in universities have measures and methods to facilitate learning for those students who have academic or social difficulties during their time at university. These difficulties may be due to psychic or physical disabilities, situations of long-term vulnerability or mental or learning disorders such as autism spectrum disorder (ASD), dyslexia and attention deficit hyperactivity disorder (ADHD), among others. Access to inclusion programs and the measures adopted in each case depend on the legislation of each territory and of the universities.

Despite the existence of these specific programs, the work towards real inclusion must be continuous and subject to constant review. For this reason, this project will study the actions that can be implemented in the teaching of chemistry from the analysis of the inclusion measures currently undertaken in universities of different geographies and the difficulties detected in our territory. The weak points of the service offered by the Faculty of Chemistry of the University of Barcelona will be detected and plans will be developed to reinforce the strong points, proposing both specific measures of accompaniment and examples of adaptations of academic material, always maintaining the curricular requirements.

3.1.1. Inclusion in the university institutions of Catalonia

In 2005, the Consell Interuniversitari de Catalunya, formed by all the universities of the territory, in collaboration with the Generalitat de Catalunya, promoted the creation of the project Universitat i Discapacitat a Catalunya, from now on UNIDISCAT, in order to reflect and act in front of the difficulties encountered by people with disabilities when accessing the university system and during their journey through it. The main objective of UNIDISCAT is to generate an inclusive university. With this purpose, in February 2005 a document was written to make a study of the weaknesses of the university system regards to students with disabilities or SEN and to present a proposal of measures and challenges that would allow to mark a path towards inclusion in the Catalan universities. This document³ is a first general guide to be considered, as it refers both to the characteristics and types of disabilities or disorders that universities may encounter as well as possible curricular adaptations and additional measures. In 2019,

UNIDISCAT made a compilation of the measures that are already being adopted in the universities of Catalonia in terms of care and services for students with SEN. We will not go into the content of this report, but it is worth mentioning it so that it can be consulted in case of interest.⁴

During its years of activity, the UNIDISCAT project⁵ has developed a series of activities, conferences, workshops, documents and guides that bring the Catalan university system closer to a real inclusion of students with disabilities or mental disorders. It has also collaborated in the II International Congress on University and Inclusion, organized to contribute and discuss diversity in universities and the successful transition of students with specific needs during the university stage.

The conferences that have been reviewed when doing this bibliographic work and that provide us with guidelines when it comes to making the Faculty of Chemistry more inclusive are:

- III Conference⁶, 2013. Focused on good practices with respect to educational needs at the university and makes a review of these, both with internal examples and from the point of view of entities in the sector.
- IV Conference⁷, 2015. It focuses on special educational needs and the vision and services available internationally in universities.

The path opened by the UNIDISCAT project is an opportunity to ensure equal opportunities in all universities in Catalonia, establishing minimum standards in terms of accessibility, available resources and curricular adaptations.

3.1.2. Legislation of the academic curriculum at universities of Catalonia

The Lei Orgánica 6/2001, of December 21, 2001⁸, states in Title V, article 31, that the competent organ for the evaluation, certification and accreditation of official degrees valid throughout the national territory is the National Agency for Quality Assessment and Accreditation, which reports to the Government. Although ultimately it is the Government who establishes the official degrees, the article 2 of the same law, refers to the autonomy of the universities, which will have freedom in the elaboration of study and research plans and the issuance of official degrees. Section 5 of the same article states that each Autonomous Community is responsible for the coordination of the Universities within its competence.

Thus, as long as the general standards established by the Government are respected, the competence in the regulation of the university system of Catalonia lies on the Generalitat. The Llei 15/2015 of July 25⁹ holds that the Agència per a la Qualitat del Sistema Universitari de Catalunya (AQU Catalunya) is responsible for the evaluation, accreditation and certification of quality in the field of Catalan universities, as well as to serve as a guarantee of international projection. AQU Catalunya is, therefore, the body that represents the competences of the Generalitat in the catalan university system. Even with the existence of this regulation, further on, reference is made to a shared competence with the universities, valuing and encouraging the autonomy of them. Therefore, if the regulatory frameworks mentioned above are complied, it is the universities in their autonomy that are in charge of offering degrees, evaluating the structure and the curriculum in order to satisfy the international requirements and adaptations. Within this autonomy, the twenty-fourth disposition of the Lei Orgánica 6/2001⁸ highlights the importance of non-discrimination regards to people with disabilities:

«3. Las universidades promoverán acciones para favorecer que todos los miembros de la comunidad universitaria que presenten necesidades especiales o particulares asociadas a la discapacidad dispongan de los medios, apoyos y recursos que aseguren la igualdad real y efectiva de oportunidades en relación con los demás componentes de la comunidad universitaria.» (Lei Orgánica 6/2001).

We can conclude that all the adaptations made to the academic curriculum, the use of alternative methodologies and the additional resources that may be needed to guarantee equity in the process of obtaining an official university degree are within the competences of each university, whenever the minimum knowledge to be acquired or the specific skills to be developed for each degree are not altered.

3.2 MENTAL DISORDERS INVOLVING SPECIAL EDUCATIONAL NEEDS: CLASSIFICATION

Following the DSM-V Manual¹⁰, a classification of the most important disorders is presented below. We have considered the frequency with which students of the Faculty of Chemistry of the UB are diagnosed with them and the scope of this work. A brief description is made of the characteristics of the disorders that can manifest a specific difficulty or need to students during university studies. Although this classification introduces the most common disorders in higher education, the wide range of existing mental disorders should be kept in mind.

- Autism spectrum disorder (ASD). Within the diversity encompassed by ASD, we will focus on those students who present Asperger's Syndrome, which is characterized by presenting high abilities in focused interests. Mainly, students with AS may encounter difficulties in adapting to changes, as they show a certain degree of inflexibility. Social interactions, such as group work and communication with colleagues or teachers are complicated, as they do not know how to interpret non-verbal language. Likewise, any ambiguous communication can be a difficulty for them. This can generate problems in the interpretation of the statements of exercises and exams.
- Attention deficit hyperactivity disorder (ADHD). The two basic characteristics are inattention and hyperactivity. Hyperactivity, on the one hand, can affect the ability to maintain a relaxed and appropriate behavior during classes. On the other hand, inattention tends to generate more inconveniences in the educational environment. These added difficulties include taking notes, following up on lectures, completing activities and meeting deadlines. Their performance in evaluation tests may also be conditioned, due to the difficulty in maintaining a sufficient degree of concentration for a period of time.
- Specific learning disorder. Specific learning disorders can manifest themselves with difficulties in understanding elaborated or dense texts. Within these disorders we can highlight dyslexia, a fairly frequent pathology that hinders both the understanding of the statements and the correct spelling in writing. Also, important dysfunctions can occur when performing numerical calculations.
- Schizophrenia spectrum. The difficulty that a person with a pathology that is part of the schizophrenia spectrum may encounter is the possibility of having a crisis in the educational environment and the management of this crisis in an effective and safe manner. Sustaining a high level of concentration for long periods of time, as is necessary in academic activities, can lead to a major crisis.
- Bipolar disorder. People with bipolar disorder may have difficulty following routines because they may experience manic, hypomanic or major depressive episodes with varying frequency. This affects class attendance and the rigidity of deadlines. The great variability of profiles and external conditioning factors make it necessary to provide personalized attention to these people in the academic context.

- Depressive disorders. The characteristics of depressive disorders that can most significantly affect academic activities are lack of concentration, decreased energy and loss of interest or generalized demotivation. These affectations can be translated in a lack of constancy or in an apparent abandonment of the studies.
- Anxiety disorders. The generalized anxiety disorder makes it difficult to concentrate and increases the possibility of going blank, for example, during an exam. Difficulty in making oral presentations should also be taken into consideration for students with social anxiety.
- Obsessive-compulsive disorder. Intrusive and obsessive thoughts generate anxiety and can lead to impulsive actions. The anxiety or discomfort generated by OCD can make it difficult to follow the course on an ongoing basis.
- Personality disorders. They are characterized by instability both emotionally and socially. The academic adaptations to be applied will be marked by the therapeutic approach being carried out by the student.

In addition to the mentioned disorders, there are other situations that may be encountered by university students and that may cause additional difficulties in their academic course. These situations are diverse and should be taken into consideration. Some examples are survivors of gender violence, students in a situation of vulnerability due to the lack of decent housing, abandonment, and other situations which may cause additional difficulties for the student.

3.3. INCLUSION AT THE UNIVERSITY OF BARCELONA

Currently, the University of Barcelona has the Student Support Service (SAE for its acronym in Catalan) that provides guidance and support to prospective and new students. Within the SAE we can find the Integration Programs Unit¹¹, with programs aimed at students with physical and mental disabilities and students with specific educational needs, either due to temporary situations or due to chronic neurodivergences. In order to have access to the services of the Integration Programs Unit, it is mandatory to present a disability certificate or, in the case of students with SEN, a report issued by a professional in the field of mental health.

The Integration Programs Unit plans to offer advice and information to those students with SEN or disabilities through a variety of proposals, ranging from tools and technical aids to facilitate academic activity, to the possibility of a student support for the hearing impaired or ICT accessibility measures. They also carry out the Projecte Studia, an agreement with the Hospital

Clínica, to offer support to students with long-term illnesses that require hospitalization. The Integration Programs Unit also offers specific support for students with autism spectrum disorder, which will be explained in the following section.¹¹

Two different programs are also available. The FEM VIA program, aimed at students with disabilities, and the AVANÇA program, which is aimed at students with SEN (who do not have a disability certificate).

In this work we will not go into the support and accompaniment for people with disabilities, neither physical nor mental, but in the services addressed to students with SEN.

3.3.1. Specific programs for students with SEN

In this section we will look more specifically at the services and programs currently offered by the SAE, focusing specifically on those that affect students with specific educational needs.

3.3.1.1. Curricular adaptations

The University of Barcelona offers the possibility of making curricular adaptations to students with specific learning difficulties¹², as long as these adaptations do not imply any variation in the level of requirements of the degree program. To make use of this service, the disability or disorder must be justified with the appropriate certificate or diagnosis made by a professional with the corresponding competences.

The attention of this service is individualized, studying each situation and proposing specific measures according to each student, based on the SEN and the degree he/she is going to study or is currently studying. To make this possible, the student must contact the SAE and the SAE will then contact the study coordinator of the corresponding degree or the specific tutor to pass on the information to the professors involved in the subjects taken by the student.¹²

3.3.1.2. MeetUp Workshops

MeetUp workshops¹¹ are meeting places for UB students with autism spectrum disorder, mostly with Asperger Syndrome (AS). These workshops are organized in collaboration with the Associació Asperger de Catalunya (AAC) and consist of face-to-face meetings (with the current exception, due to Covid-19, which have become virtual). The meetings are held approximately once a month. Their objectives are to establish a space to share experiences lived during the university period, to serve as a support and guidance point in the social life of the students and

to offer tools and resources through workshops on specific topics helping to detect difficulties and to facilitate academic aspects.

The meetings can be attended by those students with ASD who wish to participate and will be assisted by a multidisciplinary professional team formed by Judith López and Sergi Mampel, psychologists of the AAC; Jordi Molina, technician of inclusion of the SAE and Rosa Albalat, professor of the Faculty of Chemistry of the University of Barcelona.¹¹

3.3.1.3. Inclusion program of Chemistry Faculty

Currently, most of the faculties of the University of Barcelona do not have specific programs for students with SEN. This means that all students at the university can access to the same resources and services through the Student Support Service (SAE).¹¹ However, each academic field has its own characteristics which are significant enough to have to have an inclusion program focused on each particular subject. The Faculty of Chemistry has launched an Inclusion Program paying attention to the specific difficulties that teachers may encounter when carrying out their educational task with students with SEN.

This specification will be made following a general pattern, which can be easily adapted to the other courses taught at the University of Barcelona. Thus, students would have at their disposal a general attention service of the university and different inclusion programs that, although they could be under the umbrella of the SAE, would be specific to each degree or faculty.

The next academic year the PAT (Pla d'Acció Tutorial) of the degrees of the Faculty of Chemistry will incorporate, officially, the figure of the inclusion tutor. This new agent, which has been in operation since February 2020, provides support to students with SEN throughout their university career. The inclusion tutor works simultaneously with the academic tutor with the aim of making the Faculty of Chemistry more inclusive. Their functions are described in the appendix 1 of this report. The PAT will also emphasize the importance of a collaborative work of all faculty teachers to detect students who, although undiagnosed, may have special educational needs and require specific support.

4. OBJECTIVES

The main objective of this work is to make a comparative study of the inclusion services and methodologies addressed to students with Special Educational Needs at universities of different geographical areas. These areas have been chosen in order to include a variety of educational models: the Anglo-Saxon, the north American and the North, Central and South European systems. From the analysis of the protocols that are being carried out, adaptable measures will be proposed to the chemistry teaching, while respecting the legislation corresponding to the university studies in Catalonia.

From the comparative study, we want to present a report that contributes to achieve a more effective inclusion that allows detecting and accompanying the students of the faculty who have mental health disorders affecting their academic life. For this purpose, it is intended to offer these students adaptations that minimize the added difficulties they face during their academic trajectory within the university.

5. METHODS

The study was carried out by consulting the guidelines of the student services of each university. The information used is public, just as it is in the case of the UB. The following criteria were used to select the universities studied:

- That it was a public university. In this work, only public universities have been considered since their work methodologies and budgets tend to be more similar.
- The relevance of the university. Important universities have been chosen within each geographical area. Whenever possible, the value of the chemistry degree or related degrees were also considered.
- Whether the program was complete and what information was accessible to the public.

The study that has been done includes the adaptations made in both the evaluation system and in the learning methods. However, the Inclusion Program of the Faculty of Chemistry, for the moment, is only carrying out adaptations regarding the assessments.

Information regarding the inclusion program of the faculty of chemistry, which will be implemented in the next academic year, has been provided by the coordinator of the program, who is also the tutor of this project.

Additionally, papers on education, disabilities, mental disorders and diversity in higher education and chemistry were consulted.

To facilitate the analysis of the inclusion protocols for students with SEN of the different universities and the subsequent comparison to the protocol currently applied in the faculty of chemistry, each section has been structured starting with a brief introduction and followed by a table with the most important adaptations. The adaptations are marked in different colors. Those included regularly in the Inclusion Program of the Faculty of Chemistry are highlighted in green and the adaptations applied sporadically are highlighted in blue. An example of the comparative analysis methodology used is shown below.

Need to leave a class or seminar	The teacher will be informed of the possibility that the student may need to leave the room, with the aim of not paying attention to him/her.
Flexibility in deadlines	Extending or adjusting the deadline for assignments.
Note-taking support	You will receive notes from the classes that you attend. These notes are going to be taken by another student that will be compensated.

6. COMPARATIVE STUDY AND DISCUSSION

6.1. EUROPEAN UNIVERSITIES

6.1.1. University of Milan

The University of Milan has specific services and supports for students with disabilities and for students with specific learning difficulties that guarantee equality during university studies, thus making the university more inclusive. To access these services, it is essential to present a certificate of disability or a medical diagnosis. The service for students with specific learning

difficulties is aimed mainly at students with dyslexia, dyscalculia and other difficulties that affect the learning process. Based on the diagnosis and an interview with the student, the service professionals draw up a personalized document specifying which adaptive measures the student is eligible for.¹³¹⁴

Both the service for students with disabilities and the service for students with specific learning difficulties follow the general guidelines of the Conferenza Nazionale Universitaria Delegati per la Disabilità (CNUDD), established in 2001 with the aim of coordinate and guide Italian universities in favor of inclusive and accessible education for all.¹⁵

Table 1 shows the specific supports offered by the services of the University of Milan that can be supportive for students with specific educational needs.

Accommodations	Brief description
Reference teacher	At each faculty, students with SEN can address to a reference professor to solve doubts or procedures.
Exam arrangements	<p>The student must send an email to the teacher with the request and the accrediting document, at least 10 days before the exam. The possible adaptations are:</p> <ul style="list-style-type: none"> - Extra time. - Alternative exam format (oral/written). - Splitting the exam into two or more parts. - Use of concept maps or forms. - Use of computer. - Reading tutor in written exams.
Study tutor for specific situations	A specific study tutor, expert in the subject to be studied, can be requested. The tutoring can be individual or in groups.
Book loans	The library service offers the possibility of increasing the loan time.

Table 1. Support for students with disabilities or specific learning difficulties.¹³¹⁴

Among the services that the university offers to students, we also find the individual counselling service for students, which consists of a consultancy and advisory service aimed at those students who are experiencing difficulties in the personal area that have an impact on their academic performance.¹⁶ Within this service two types of support can be differentiated:

- Counselling in study method. It includes a maximum of 5 individual sessions, aimed at helping students to acquire study methodologies for greater autonomy

and efficacy in their studies. They are specific for students with purely academic difficulties (organization, learning strategies, communication or structuring in writing).

- Counselling for emotional difficulties. This is a time-limited service offered by a professional in the field and specifically aimed at students with emotional problems that affect their educational performance. For example, difficulty in relating to classmates and teachers, low self-esteem or self-confidence, test anxiety or loss of motivation in studies.

6.1.1.1. Comparative study between services at the University of Milan and at the Faculty of Chemistry of the UB

The protocol followed at the University of Milan does not differ significantly from the one at our faculty. However, in the Faculty of Chemistry the measures are agreed with the student in a much personal approach. Among the adaptations that are made at the University of Milan and that the Faculty of Chemistry does not contemplate, we can highlight the option of using a study tutor expert in the subject to be studied. Thus, from the University of Milan we can focus on the tutoring service, more extensive and with distinct profiles for each situation.

6.1.2. University of Gottingen

The University of Gottingen offers a wide range of diversity services. They are certified by the company Stifterverband as passing the Shaping Diversity audit. During the two-year process (2016-2018), a diversity strategy was developed and implemented in Gottingen.¹⁷ The strategy encompasses several areas of diversity, but we will focus only on diversity for students with disabilities or mental health disorders. Through the Barrier-free studying program, support is provided to students with disabilities, mental disorders and chronic illnesses.

For access to academic accommodations, students with SEN can contact the university's student services department, which will direct them to the person responsible for the diversity strategy. To receive support from Barrier-free studying, a certificate of disability or a diagnosis of mental health disorder must be presented. The exam accommodations that can be offered to overcome the disadvantages due to SEN are on a case-by-case basis for each individual student. Therefore, measures are taken on an individual basis and discussed with the student in question.¹⁸

Table 2 shows some of the most common testing accommodations and other accommodations that can affect the academic activity.

Accommodations	Brief description
Exam accommodations	<ul style="list-style-type: none"> - Breaks during the examination. These do not count in the exam time. - Separate room to take the exam. - Change in the type of exam (oral/written). - Extension of the time. - Use of support tool or assistance person.
Adaptations of internships	Split or reschedule the periods or find a way to substitute the evaluation of internships.
Flexibility in deadlines	Extending or adjusting the deadline for assignments.
Class attendance	Adapt the evaluation when class attendance is mandatory.
Study Assistants	Their aim is to give support on a day-to-day basis. They are usually other students.

Table 2. Support for students with SEN of the University of Gottingen.¹⁸

Another remarkable aspect of the University of Gottingen is the commitment of the student union AStA with students with disabilities or chronic illnesses. They are currently working together to create a specific department to represent students with SEN.¹⁸

6.1.2.1. Comparative study between services at the University of Gottingen and at the Faculty of Chemistry of the UB

As we have seen in the introduction, universities are taking steps towards becoming more inclusive. The University of Gottingen is just one example of the many universities in Germany that have passed the Shaping Diversity audit.

One of the adaptations made by this university is enabling an alternative examination room, which is not currently in force in the Faculty of Chemistry. The role of the study assistant, carried out by other students, can also be a valuable opportunity in chemistry teaching. Although the factors to evaluate are many, it could guide a proposal for laboratory support.

6.1.3. University of Stockholm

As we could expect, since their educational system is known because of development and innovation, universities located in north-Europe, countries like Sweden or Finland, also have special services for students with disabilities. The University of Stockholm has a special pedagogical support service for those students with disabilities or mental health conditions long-term affecting. This service wants to provide an inclusive environment and equal opportunities to all students attending the University of Stockholm.

The Special pedagogic support¹⁹, by referring to long-term disability, include all the health conditions that can affect the academic life of the students. This means physical impairments, specific learning disorders (for example, dyslexia), ADHD, Autism Spectrum Disorder, depression and other mental health conditions or chronic health problems such as Crohn's disease.

The applying system for this service works through Nais. Nais is a system used for many high education institutions. Only the coordinator of special pedagogical support can access the information submitted. Students need to register and load documentation done by a qualified professional (doctor or psychologist, for example). After the application has been sent, the coordinator of special pedagogical support contacts each student for a meeting where the available supports will be discussed and decided. The students will receive a certificate with the recommendations of accommodations according to their health condition. The support recommended presents the type of adjustments the student can aim but are the departments or teachers who will decide which support can be provided depending on the requisites of the courses. The coordinator of special pedagogical support is the contact between the student and the services. The coordinator determines the recommendations of support and can provide support to the departments in order to stablish satisfactory adjustments.¹⁹

Table 8 shows the adjustments students can aim, containing only support that could be useful for students with SEN.

Support and adjustments	Brief description
Note-taking support	You will receive notes from the classes that you attend. These notes are going to be taken by another student that will be compensated.

Examination	<ul style="list-style-type: none"> - Taking the exam in a different place, alone or with a small group. - Extra time. - Use of digital tools. - Alternative form. - Adapted exam (without changing the curriculum).
Course material in alternative form	Students can ask for the literature needed during the curs in alternative formats, like talking books or e-textbooks. This service is arranged by the University Library.
Mentor	Mentor aid will be focused in achieve an independent effective study by the student. The help mentor can bring is temporary. Study methods and organization skills are some of the tasks provided by the mentor.
Relaxation rooms	There are relaxing rooms available under request.

Table 3. Support for students with SEN from the University of Stockholm.¹⁹

6.1.3.1. Comparative study between services at the University of Stockholm and at the Faculty of Chemistry of the UB

The methodology at the University of Stockholm is very similar to the one used at the Faculty of Chemistry. The special pedagogic support coordinator maintains constant communication with the students' teachers to facilitate and assess accommodations. This university offers the option of getting notes of the classes attended, which can be very useful for students with attention deficit. In addition, as has been mentioned about the University of Milan, it allows an alternative location to take exams.

6.2. ANGLO-SAXON UNIVERSITIES

6.2.1. University of Manchester

The University of Manchester has a Disability Advisory and Support Service (DASS)²⁰, which works to provide the university with equal opportunities for all students and staff, offering a specific service and support to the students with disabilities or mental disorders. It aims to make the academic experience e satisfactory for all their students. DASS not only offers support to students who need it, but also addresses the parents or legal guardians of these students, as well as the teachers they have classes with. This support makes it possible to facilitate the accompaniment of the student and to establish knowledge and correct behavior towards students with SEN.

Students must apply for access to DASS by filling out a registration form and an evidence form. The latter consists of a certificate of disability or a diagnosis signed by a medical professional. Some learning disorders admit an internal evaluation, carried out by the university itself.²⁰

Once registered with DASS, students will receive the University Support Plan with all the services available to them. The services, variable according to the needs of each student, include exam support and study support.²⁰

- Exam Support: To ensure a fair balance during the exam period, the University of Manchester offers a range of arrangements including support to create a safe environment, e.g. by changing location, and alternative exam formats.
- Study Support: This includes assistive Software and a more individualized human support. Assistive software includes programs to facilitate study and organization, as well as programs for text comprehension and document correction. Personalized support refers to support provided by teachers or specific agents.

Table 4 shows the general adaptations proposed for the examinations and for the study methods and materials. Table 5 summarizes the functions of the specific agents that can be available to students with SEN according to their Support Plan.

Support of the DASS	Brief description
Exam Support	<ul style="list-style-type: none"> - Alternative format paper, such as changing the color, size or type font. - A program to support the improvement of the learning-related skills. - Extra time. - Special attention from the person supervising the exam, who will be informed of the student's needs. - Reading assistant. The person invigilating the exam will read to the student both the test questions and the student's answers. - Rest breaks. - Toilet breaks. - Other adaptations such as shorter sentences or extra clarifications.
Course material in advance	Provide study material in advanced, either PowerPoint or papers.
Alternative format of course	Supply the academic material in the most convenient format for

content	the student.
Awareness of the student's condition	The teacher will be aware of the student's conditions and how these affect the learning process.
Technical vocabulary glossary	In specific areas, a glossary of technical vocabulary can be supplied to facilitate the comprehension of texts.
Work group	Additional challenges when doing group work will be assessed to see if special accommodations are needed.
Need to leave a class or seminar	The teacher will be informed of the possibility that the student may need to leave the room, with the aim of not paying attention to him/her.
Modification or guidance of course materials	Possibility of adding extra notes or a detailed and more organized guide of the course contents.
Class attendance	In cases where a student is unable to attend all classes, the information of the missed lessons will be provided to him/her/them.
Flexibility in deadlines	The deadlines for assessment activities can be extended.
Laboratory work	Possibility of additional accommodations in experimental sessions.
Oral presentations	Alternatives may be considered if the student has trouble giving oral presentations.
Timetabling	Schedule a specific space if required.
My Learning Essentials	A program to support the improvement of the learning-related skills.

Table 4. Accommodation available at the University of Manchester for students with SEN.²⁰

Study support agents	Brief description
Study coaching	Individualized work with students on a daily basis to help with organization, motivation and study skills.
Study Assistant	Support in adapting to new situations and routines.
Mental health mentor	Provide psychological help during the academic year, but do not perform therapy.

Specialist advisor	Specific support for students with ASD. In addition, they can participate in weekly supervised meetings with other students with ASD where they can share experiences and strategies.
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Table 5. Support for students with SEN provided by specific agents.²⁰

6.2.1.1. Comparative study between services at the University of Manchester and at the Faculty of Chemistry of the UB

The service for students with SEN at the University of Manchester points out the fact that not only students, but also their parents or legal tutors, can be involved as well. This approach, although it may not seem significant, is especially important and it is also part of the Inclusion Program of the Faculty of Chemistry.

Again, one of the measures is to have a safe environment when taking exams.

An outstanding point of this university is the wide variety of support assistants to whom students with SEN can be addressed. These roles could be useful for not overloading the functions of the Inclusion Tutor, in the case of the Faculty of Chemistry.

6.2.2. University of Bristol

Among the student support offered by the University of Bristol there is the Disability Service²¹. This program is aimed at students with disabilities, learning difficulties and other health conditions. The main objective of the Disability Service is to ensure an inclusive university. Students who can be eligible for this service are those with specific learning difficulties, such as dyslexia or ADHD; mental disorders, such as depression, anxiety or OCD); autism spectrum disorder; physical disabilities and ongoing health conditions, as multiple sclerosis, cancer, etc. To access the service, a diagnosis written by a medical doctor or a psychiatrist (according to the condition) must be submitted. In the absence of a diagnosis, students can contact the Students' Health Service.²¹

The Disability Service has two different types of support: study support and study support specialists, the latter requiring extra funding.

The compilation of modifications considered by the Disability Service for each student is reflected in the Disability Support Summary. This will serve as a guide for the School Disability Coordinator as well as for the teachers or any other assistant.²¹

Table 6 illustrates the general services offered by the Disability Service and Table 7 shows those that require funding.

Arrangements of the Disability Service	Brief description
School Disability Coordinators	Is the Disability Service contact agent of each degree.
Alternative Exam Arrangements	<ul style="list-style-type: none"> - Extra time. - Computer use. - Breaks during the exam. - Alternative exam room. - Alternative way to take the test (oral/written).
Other Adjustments	It includes other adaptations such as access to documents in a variety of paper and font formats or in digital format.
Workshops	<p>Work groups of a maximum of 10 students that offer study support to students with learning difficulties. During the 2020-2021 academic year, the following workshops have been organized:</p> <ul style="list-style-type: none"> - Time management and organization - Notetaking strategies and software - Active reading - Deconstructing assignment questions - Critical thinking - Building academic arguments - Structuring assignments - Improving academic style - Proof reading and concise writing - Referencing source material correctly - Am I Dyslexic (for students, not yet diagnosed, who are hesitant about whether they have dyslexia or not)

Taulla 6. Services for students with SEN at the University of Bristol.²¹

Specialist study support (needs funding)	Brief description
Specialist Mentor	It assists in developing strategies for coping with the academic day, both in terms of organization and emotion management.
Study Skills Tutor	It helps to improve study skills, such as research methods and assignment structures.

Exam Support Workers: Readers, Scribes, Prompters	Specific support during exams. They can read the questions, write the answers or set up a dynamic to facilitate the student to reach a higher level of concentration.
Library Support Assistant	Focused on the search for library material.
Workshop/ Laboratory Assistant	Specific for lab work or workshops.
Study Assistant	General support. Includes guidance, accompaniment and aid to solve problems.

Table 7. Assistance agents available through the Disability Service, subject to an extra fee.²¹

6.2.2.1. Comparative study between services at the University of Bristol and at the Faculty of Chemistry of the UB

The case of the University of Bristol is slightly different from the previous ones analyzed. Firstly, it has the general accommodations for students with SEN, which are similar to those of the other Universities. However, specialist study assistants have an additional fee. This extra cost can be funded depending on the situation of each student.

Among the adaptations offered, as already seen in some of the other universities, an alternative examination room is available. It is worth to mention the School Disability Coordinator, as it is a specific contact person per each degree. This coordinator resembles the Inclusion Tutor of the Faculty of Chemistry, but with fewer duties.

6.3. AMERICAN UNIVERSITIES

6.3.1. University of Washington

The University of Washington has a specific program for students with special needs, the Disability Resources for Students (DRS)²². The purpose of the DRS is to provide the same opportunities to all students regardless of their conditions. Due to the importance of inclusion and diversity in society, DRS pretends to be a path to guarantee full equality for students with disabilities at the University of Washington.

When talking about disabilities, the DRS refers to a wide range of health conditions. Students who can address this service are the ones with both physical and psychical disabilities, mental health issues (depression, anxiety, bipolar disorder, ...), specific learning

disabilities, ADHD and other health conditions that affect long-term such as cancer, HIV, etc. The DRS recommends the students to contact them even if they hesitate about if their condition can allow them accommodations. To successfully access, the DRS requests official documentation which must inform of the health condition and its impact on education. DRS offers a general form that the specialists can refill and/or specific instructions for some of the disabilities.²²

The process to assign one or another accommodation take place in the Access Planning Meeting and it is up to a DRS Coordinator and the student. Once the Coordinator and the students fix the approved accommodations, the second will have to request for the ones that want to be applied each semester.²² The accommodations that student can ask for are showed in the table 7. These accommodations are limited at the ones that can be used by students with especial educational needs.

Accommodations	Brief description
Alternative Testing	<p>Alternative accommodations in exams bring students the possibility of another place or method to take the exams, to provide equal conditions with the rest of the students. Despite different accommodations can be discuss, the most common are:</p> <ul style="list-style-type: none"> - Taking the test in an environment with less distraction (such as another class or allowing to use cancelling headsets. - Using a private room. Only the professor will be present in the room. - Extra-time.
Audio recording lectures	<p>This accommodation allows recording classes or conference in purpose of having the possibility of review them later.</p>
Disability-Related Absences	<p>An absence of a student during the class period when their condition has an impact to the daily routine and could interfere with the classes.</p>
Priority Registration	<p>Priority in the registration process offers the option of making the register process the first day of the registration period.</p>
Reduced credit load	<p>To have financial aid, the required load of credit for semester is 12. Students with reduced credit load will maintain the financial aid even though take less credits.</p>

Table 8. Services of University of Washington DRS.²²

6.3.1.1. Comparative study between services at the University of Washington and at the Faculty of Chemistry of the UB

The University of Washington, as it is done in the Inclusion Program of the Faculty of Chemistry, agrees with each student on the adaptations to be chosen. Among the adaptations they recommend, we can highlight, as we have done with the other universities, the possibility of taking the exam in a different room. In addition, this university enables the use of cancelling headsets. This may be interesting for students with ASD or ADHD.

They also prioritize students with SEN when it comes to registration. It seems to be helpful for students with SEN who need to follow scheduled routines and organize their time in advance.

7. CONCLUSIONS

From the results of the bibliographic research carried out, some conclusions have been obtained in accordance with the approach and objectives of this report.

All the universities studied or consulted have a student attention service with specific actions addressed to students with disabilities or mental health disorders.

The comparative analysis reveals that the Inclusion Program of the Faculty of Chemistry incorporates a great number of the adaptations described in the bibliographic research of this work.

It is observed that all universities, regardless of their geographical area, emphasize the importance of providing a safe space for taking the exams. This is considered a further improvement to add to the faculty's Inclusion Program.

It is worth pointing out that the research we have carried out has been of services equivalent to the SAE of the University of Barcelona. The fact of having a specific Inclusion Program for the Faculty of Chemistry is a strength that distinguishes it from the analyzed programs. Therefore, as it is shown in Appendix 1, more individualized attention focused on the specific teachings of each degree can be provided.

Finally, we suggest that the study carried out should be completed by developing a rigorous proposal of study materials and adapted laboratory guides.

In addition, to implement the protocol of the Faculty of Chemistry to other faculties of the University of Barcelona, it is recommended to carry out a study of the program's efficacy not only considering the students' feedback, as it is currently being done (see Appendix 1), but also taking into account the feedback from the professors.

In the long term, it would be interesting to carry out a broader study to see if the Inclusion Program of the Faculty of Chemistry improves the academic experience of students with SEN. Factors that should be evaluated are the detection of students with SEN, the valuation of the support offered and if it has helped them to achieve their goals. So far, students who have been

accepted into the Inclusion Program have rated the support positively, achieving better results in their studies than they did before.

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12. ACRONYMS

AAC	Associació Asperger de Catalunya
ADHD	Attention deficit hyperactivity disorder
AQU Catalunya	Agència per a la Qualitat del Sistema Universitari de Catalunya
AS	Asperger Syndrome
ASD	Autism spectrum disorder
AStA	Allgemeine Studierendenausschuss
CNUDD	Conferenza Nazionale Universitaria Delegati per la Disabilità
DASS	Disability Advisory and Support Service
DRS	Disability Resources for Students
DSM-V Manual	Diagnostic and Statistical Manual of Mental Disorders V
HIV	Human immunodeficiency viruses
ICT	Information and communication technology
OCD	Obsessive-compulsive disorder
PAT	Pla d'Acció Tutorial
SAE	Servei d'Atenció a l'Estudiant
SEN	Special educational needs
UB	University of Barcelona
UNIDISCAT	Universitat i Discapacitat a Catalunya

APPENDICES

APPENDIX 1: PAT OF THE FACULTY OF CHEMISTRY: INCLUSION TUTOR

The information below corresponds to an internal document of the Faculty of Chemistry on how to make a follow-up of students with SEN.

SEGUIMENT ESTUDIANTS PROGRAMA D'INCLUSIÓ

INCORPORACIÓ AL PROGRAMA

- Informació SED
- Informació SAE
- Informació Tutor Acadèmic, Cap d'Estudis o professors de l'estudiant no acreditat.

PRIMERA ACTUACIÓ

- El tutor d'inclusió elabora un cens d'estudiants partir de:

Consulta a la SED sobre quins alumnes tenen reducció de matrícula,

Consulta al SAE sobre alumnes de la Facultat de Química que han sol·licitat entrevista i estan pendents de ser avaluats. Dels alumnes que ja han estat avaluats el SAE envia informe , tant el Cap d'Estudis com el tutor d'inclusió.

Informació procedent dels Tutors acadèmics que tenen coneixements d'alumnes amb necessitats específiques d'aprenentatge.

Informació de professors que tenen sospita de tenir estudiants amb necessitats especials.

PLA DE TREBALL:

A) Estudiants de nova incorporació al programa

- Es recull informació de l'estudiant (tutor acadèmic, any d'ingrés, expedient acadèmic, assignatures matriculades,...)

- Es contacta amb el tutor acadèmic per informar-lo del cas, si és que encara no té la informació.

-El tutor acadèmic informa a l'estudiant sobre el Programa d'inclusió al passar la primera tutoria i, si l'estudiant hi està d'acord, posa en contacte a l'estudiant amb el/la tutor/a d'inclusió per iniciar el seguiment.

- Es fa una primera tutoria per conèixer les dificultats específiques de l'estudiant. Si ja es disposa d'informe del SAE, les dificultats i recomanacions genèriques ja es coneixen. Si l'alumne no ha estat entrevistat pel SAE se'l redirigeix cap a aquest servei però, a l'espera de tenir un informe oficial, es comencen les accions d'inclusió.

- Es revisen els plans docents de cada assignatura per detectar les dificultats d'aprenentatge i avaluació que pot tenir l'estudiant, a fi de poder fer les recomanacions el més adaptades possible.

- S'informa als professors de les assignatures matriculades sobre les dificultats d'aprenentatge de l'estudiant i les recomanacions per adaptar aprenentatges i models d'avaluació.

B) Estudiants incorporats al programa

- Atès que ja es coneixen les dificultats genèriques de l'estudiant, un cop iniciat el curs o semestre, es deixen passar una o dues setmanes i es fa una primera tutoria per a que l'estudiant indiqui con està seguint el curs i quines adaptacions creu que el podrien ajudar. Es discuteix i pacten aquestes adaptacions per a, posteriorment, parlar amb els professors i fer les recomanacions pertinents.

Les recomanacions fetes al professors són revisades per aquests que les poden modificar segons el seu criteri i model d'avaluació.

