MEET-UP PILOT: AN INCLUSIVE PROGRAM FOR STUDENTS WITH AUTISM SPECTRUM DISORDER AT UPC

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Abstract
Meet-Up is an innovate pilot program for students enrolled at Universitat Politècnica de Catalunya (UPC) with Autism Spectrum Disorder (ASD). UPC is a Technical University that provides majors in the STEM (Science, Technology, Engineering and Mathematics) area. As part of the UPC Inclusion Program, an orientation program for students with an ASD was launched for the first time on September 2017 and it is currently on its second year.

Keywords: Innovation, Higher Education, STEM program, Autism Spectrum Disorder.

1 INTRODUCTION
Nowadays, colleges and universities are receiving more admission applications from young adults diagnosed with ASD than in the past. This is partly due to the fact that ASD was sometimes confused with other disorders; however, since the late 1990s the revision of the Diagnostic and Statistical Manual of Mental Disorders DSM-5 [1] has proved to be an important factor on early diagnosis and intervention of ASD. Therefore, many of these students are now in a position to consider enrolment in higher education programs, which was not a viable option a few years ago. Since lecturers and schools at UPC have little experience of students with these disorders, a specific orientation program was designed by UPC with the support of professionals from ASAC (Associació Asperger de Catalunya), an Autism Spectrum local organization. The orientation program Meet-Up was deployed with follow-up sessions conducted by the ASAC’s psychologists team [2].

Follow-up sessions are held at lunchtime, always at the same time and place, in order to provide students and Meet-Up staff with a familiar environment and a relaxed atmosphere conducive to free and open discussion. We have also experimented with the use of technology as a tool for cognitive support to help students focus on independence and control in order to reduce stress. At this early stage, we confined the experience to electronic agendas, a contact list using WhatsApp and access to the virtual campus by means of smartphones.

The promotion of the Meet-Up program was highly unsatisfactory in the first edition and a real concern for the Meet-Up staff because students were allowed to incorporate ongoing in the course edition. This work presents the design of the initial Meet-Up pilot, the second edition revised program and the qualitative results that cover the feedback from the first edition. Student profiling and initial screening tests (STAI, BDI, EQ and AQ) have been incorporated in the second edition, as well as substantial promotion efforts; also, organization issues that appeared in the first edition have been addressed. First indicators show a 100% increment in the number of students continuously attending the monthly follow-up sessions.

2 METHODOLOGY
2.1 Intro
ASD is a disorder that occurs mostly in children and carries severe dysfunctions in the aspects of social relationship and learning. Asperger's Syndrome (AS) [3] is a specific condition within ASD, and people that suffer it are characterized by a normal or above average intellectual coefficient, but with difficulties in understanding social codes and relationships among people, whether they are the same (other students) or teachers, parents, etc. A higher incidence of ASD has been demonstrated among people with abilities for music, engineering and technology [4]. Therefore, technical careers at UPC are more prone to having students affected by ASD. Furthermore, it has also been proved that science and engineering students are less used to mutual collaboration than those enrolled in other studies [5]. In
addition, young adults with an ASD are more likely than the general population to pursue subjects such as science and computer science. Some authors [6], [7] show that the rate of students selecting a STEM major is higher for people with an ASD than that of students from the general population. In particular 12% of students with an ASD chose a science major, compared with an 8% for the general population; also, 16% of students with an ASD chose computer science as their major, compared with an 7% for the general population.

Some recent studies exist on the needs of college students on the autism spectrum and the initiatives to deal with these requirements ([8]–[10] among others). Nevertheless, very few are devoted specifically to STEM degrees [4], [7], [11].

There are some epidemiological studies that have been specifically conducted to estimate the prevalence of Asperger's Syndrome. It is worth mentioning that Asperger's Syndrome is currently included in the ASD according to DSM-5.

Studies that specifically investigated the prevalence of Asperger Syndrome [12] were done in two phases with a first screening for questionnaires of 1,519 children between 7-16 years from 5 ordinary schools of Goteborg and a second phase in which interviews were conducted with parents and teachers as well as observations of children. A prevalence of 0.29-0.35% was obtained for definitive cases with a male/female ratio of 4/1. If the definitive cases and possible cases of Asperger Syndrome were added, then the prevalence was increased to 0.71%. The authors themselves, in another subsequent epidemiological study of autism-related disorders performed in paediatric centres specialized in autism, found a similar prevalence (0.48%) for definitive cases of Asperger's Syndrome [13].

A recent study by Hervás et al. [14] indicates that the epidemiological prevalence of ASD is 1 out 68 children of 8 years, estimates far away from the first guidelines that determined ASD as a rare disorder.

For the most recent ASD prevalence estimates [15], data were collected from the health and special education records of 8-year-old children residing in 11 areas of the United States during 2014. An average of 1 out of 59 (1.7%) children of 8 years who had ASD in 2014. It is confirmed that ASD is four times more common in children (2.7%) than in girls (0.7%), and is given in all ethnic and racial groups.

Many students with an ASD who have the capacity to pursue higher education, science, technology, engineering and mathematics (STEM) bachelors face stress and difficulties when they find themselves at university. This is due to the fact that, inherently, it is difficult for them to adapt to new circumstances and they must learn to understand the new situation (Campus Nord at UPC, university studies), new rooms and building (Gabriel Ferraté library, leisure time-breakfast, lunch, where to spend time between classes in case you have free time between classes regularly or sporadically due to teacher's illness, etc.).

Before the kick-off of the Meet-Up pilot at UPC, there was no specific host program for ASD students as such, which has led to serious difficulties among students with this condition. The authors of this paper have seen these difficulties from holding direct interviews. School tutoring plans leave to the tutors the monitoring of these students [16] as well as all the responsibility; besides, tutors do not assist them with tools or proven procedures to monitor ASD students. The tutors are essential, but they cannot fall solely on their own criteria and responsibility the insertion of ASD students at UPC.

Life on campus and university colleagues offer many new opportunities for social relationships (e.g., friendships, sex, etc.). At the UPC campus there is a wide range of possible activities to be developed (sports, culture, leisure, solidarity ...). Boards and walls of the centres, like the train and bus stops, are loaded with posters and leaflets with announcements of activities that are organized both inside and outside the university to engage students in university life.

2.2 First year

In the design of the Meet-Up program, authors have studied the existing literature and discussed the expected difficulties. These can broadly be classified into two groups: interpersonal interaction and task planning skills:

- Organizing day to day and managing tasks according to priority levels is complicated and generates stress. Additionally, difficulties seem to increase with the level of stress.
- The level of stress grows as the term progresses, given the increase in the demands of assignments, exams, practices, etc.
Inclusion in the class group is a central problem. Particularly in the case of ASD students, this difficulty lies in the nature of understanding relationships. Stress seems to increase with social demands. Many feel like foreigners, even in their own families and communities, and this enforces the feeling of isolation that many people with disabilities are affected.

The characteristics of ASD and, in general, of many social disabilities, are still unknown for most professors, students and administrative staff.

2.2.1 Design of Meet-Up pilot

Any student can encounter difficulties when studying at university, mostly because it is a new environment and they need to learn to manage comfortably (in fact, many bright students in high school fail to reach university). These adversities become even more evident for ASD students; the reasons for which the university environment and the organization of the education at this stage can be especially problematic are various:

- Autonomy: university students have to organize their own time and activities (schedules, work plan in the subjects, consultation materials, etc.); they can choose flexibly, in many subjects, to go to classes or not, to do some assignments or others, to form a work group with colleagues or others, to do optional tasks or not, etc.
- Classrooms and spaces, in general, are very large and noisy.
- Academic activities are very changing:
  - The four-month periodic organization of many studies supposes, in practice, a period too short for ASD students to get used to their teachers and colleagues.
  - The dynamics of classes and academic activities is also very varied (changes from one subject to another, from teacher to teacher, and also within the subject).
  - Sometimes, students find themselves with "dead times" in their timetable (gaps between class and class, tutoring hours or group work, etc.), or with unforeseen changes (replacement of teachers for assistance at congresses, illness or other reasons).
  - Sometimes, students have to move physically to attend classes (he/she has to change the classroom from one subject to another, he/she must go to the laboratory or the computer room during the time of practices, or to go to classrooms located in other schools or faculties to study elective subjects, etc.).
- Many basic skills are taken for granted at university level (eg, learning to take notes, understanding and writing texts, basic language knowledge, computer use, abstract thinking, etc.). Some of these abilities actually pose a challenge for ASD students.
- Many people at university seem to be always busy in their own things. Teachers and students often seem overwhelmed and the level of stress increases as the semester progresses. It is assumed that whoever has any problem, doubt or need, will be the one who will take the initiative to ask or ask what they need from others. However, ASD students have difficulties in taking the initiative and asking for help.

Among the antecedents supporting ASD student beyond secondary school, the current practices have been carefully studied and documented in [8]; in their publication, the authors point out that "the autistic spectrum is a broad spectrum and each individual is different. Strategies that work for an individual may not work for another". Among others, the generic recommendations of the study to help ASD students at university include the following guidelines:

- Adapt support to the individual and not to the diagnosis
- Provide a specific space on campus, available 24 hours a day for ASD students
- Encourage ASD students to become a tutor of other younger students in their area of specialization
- Take into account the options for housing and the advantages and disadvantages of an individual room or a shared apartment if they do not live in the family home during the school term
- Use technology to help organize daily work and provide access to information that is normally given by the fact that other students are already available
- Provide assistance in the organization of space in the classroom
• Provide predictable class routines and tools to control anxiety and stress

2.2.2 First Year: Meet-Up Pilot

The Design of the Pilot began in February of 2017. The UPC contacted the Asperger Association of Catalonia (ASAC); also, it established links with professionals from other universities interested in the initiative. Dissemination of the initiative begun with the development of a promotion diptych that was distributed to the ASAC, UPC schools, conferences related to ASD, known professionals, etc.

A collaboration agreement was signed between UPC and ASAC to regulate the participation of ASAC professionals in the Meet-Up program (internal personnel from UPC did not require any binding contract).

A Welcome Session was scheduled in July 2017 which, for logistical matters, was launched in September 2017 during Session 1. From July 2017, the promotion of Meet-Up started in the website of the Office of Inclusion, as well as from Moodle (Virtual Campus ATENEA) as a banner that appeared during the enrolment process.

For the Welcome Session "Presentation of the Meet-Up program for students with ASD", an exhaustive material was included. The structure of the supporting document incorporates a description of the university enrolment process with the attainment of a digital identity within the UPC, the presentation of the Program includes the actions and the timing of the group follow-up sessions (taking into account the class schedules of the students), the use of electronic agendas, the use of the ATENEA-Moodle Virtual Campus and the use of Google Drive.

Once the best schedule for the students was agreed with the Meet-Up staff, the calendar was published on the UPC Virtual Campus (ATENEA) within a specifically created virtual classroom. During the 2017-18 academic year, there were seven group sessions, with different topics in each session proposed by Meet-Up staff, as shown in Table 1.

Table 1. Meet-Up Pilot – First Year – Course 2017-18.

<table>
<thead>
<tr>
<th>Data</th>
<th>Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>8th September 2017 Welcome session to Meet-Up students</td>
</tr>
<tr>
<td>2</td>
<td>9th November 2017 Social abilities (I)</td>
</tr>
<tr>
<td>3</td>
<td>14th December 2017 Organization and study techniques</td>
</tr>
<tr>
<td>4</td>
<td>15th February 2018 How to deal with anxiety (I)</td>
</tr>
<tr>
<td>5</td>
<td>12th April 2018 Social abilities (II)</td>
</tr>
<tr>
<td>6</td>
<td>10th May 2018 How to start new relationships?</td>
</tr>
<tr>
<td>7</td>
<td>21st June 2018 Closing session</td>
</tr>
</tbody>
</table>

At the end of the Meet-Up pilot of the academic year 2017-18, a questionnaire distributed through Moodle was used to qualitatively evaluate the initiative; in the questionnaire, students were asked to comment on their experience in terms of what they had found useful and whether they had any suggestions on changes to the program to improve it.

2.3 Second year

The dissemination of the Program was a critical aspect that emerged from the pilot and it was expanded for the academic year 2018-19’s edition; however, we must still continue improving the dissemination so that students with an ASD are motivated enough to get in touch with the Meet-Up team in order to enrol in the Program from the beginnings of university life.

In the second edition, the UPC team was composed by the technician responsible for disability (Montserrat Vilalta) and the UPC lecturer (Lídia Montero) have remained. As for the ASAC, the team of psychologists has been partially renewed; Mireia Gracia continues and Sergi Mampel has joined.

The dynamics of the follow-up Sessions during the pilot demonstrated the initial difficulty of creating a comfortable environment between the Meet-Up Team and students enrolled in the Program. Students do not know each other and the communication between them is rigid and not very agile. To address this difficulty, authors thought of promoting the use of the WhatsApp list of the Meet-Up, so that jokes,
memes, etc. could be exchanged. Additionally, the monthly periodicity of the sessions is not advisable at the beginning of the course, therefore, it was decided to make sessions every 2 weeks during the month of September, to facilitate the cohesion of the group, the confidence in the Meet-Up by part of the students and to provide the Meet-Up Team with a good knowledge of the group.

The structure of the 10 group monitoring sessions was designed to be more structured: initially a few minutes to ask about the students' novelties/concerns, then the presentation of the support tools and activities for the specific topic of the session and finally the collective lunch. The session in common did not have to exceed two hours and the information on the subject had to be posted to Moodle in advance. Anticipating duration and structure facilitates attendance during periods in which students have heavy workload.

<table>
<thead>
<tr>
<th>Date</th>
<th>Topic</th>
</tr>
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<tbody>
<tr>
<td>1</td>
<td>20th September 2018 Welcome to Meet-Up</td>
</tr>
<tr>
<td>2</td>
<td>27th December 2018 Introduction to Meet-Up group</td>
</tr>
<tr>
<td>3</td>
<td>4th October 2018 Working in a group</td>
</tr>
<tr>
<td>4</td>
<td>8th November 2018 Study Techniques</td>
</tr>
<tr>
<td>5</td>
<td>13th December 2018 Academic anxiety</td>
</tr>
<tr>
<td>6</td>
<td>7th February 2019 Social anxiety</td>
</tr>
<tr>
<td>7</td>
<td>7th March 2019 Social Abilities in University</td>
</tr>
<tr>
<td>8</td>
<td>11th April 2019 Abilities in Social networks</td>
</tr>
<tr>
<td>9</td>
<td>9th May 2019 Self Esteem and Motivation</td>
</tr>
<tr>
<td>10</td>
<td>27th May 2019 Closing session and suggestions for the academic year 2019-20's edition</td>
</tr>
</tbody>
</table>

On the other hand, before the collective sessions, an optional individual session was given by the psychologists of the Program, lecturer at UPC or the technician responsible for disability. There are issues that can be difficult to treat in a group session or worries that are difficult to say that they can be treated on a more individual level. This possibility has been very well received by the students of the Meet-Up program. The time for individual sessions on request is 45 min before the group session, in small room for individualized intervention.

The Meet-Up program has been open to students from other universities, UPC master students and non-new students. An initial difficulty that was foreseen by non-UPC students and by the students that were incorporated during the course is the access to the Meet-Up Moodle virtual classroom. Therefore, an access option for visitors with a special access code was enabled. During the first session, they explained how access would be and a small document was prepared at the disposal of the UPC administrative staff in order to distribute it to convenience.

The follow-up sessions (both individual and group ones) have been programmed according to Table 2 and at the moment there are no alterations. The support material for the sessions has been uploaded in advance into the Meet-Up Moodle Virtual Classroom 2018. The sessions' programming is also included in Moodle, as well as in a shared Google Calendar.

The second introduced adjustment affects the characterization and improvement of quality throughout the various editions of the Program. The Meet-Up Team has been identifying and adapting various screening questionnaires. The aim is to obtain a quantitative measure of the results of the program.

During the second year, 14 students have participated in a total of 8 out of 10 ongoing sessions between September and April of the academic year 2018-2019. The Meet-Up schedule is from 12:15 a.m. to 2:15 p.m. During the first hour, 15 minutes are devoted to talk in a group way about the day to day at university; during the following 45 minutes, the technicians highlight the different workshops. Workshops are held on Thursdays in the same room at UPC, to encourage routine and avoid changes and unforeseen events.
2.3.1 STAI, BDI, EQ&AQ Tests

The goal of the study was to obtain pre-post results through screening questionnaires. The students have filled four different questionnaires before the session’s beginning and they have to refill them at the end of the total sessions. The main objective is to evaluate improvements in the students enrolled in the Meet-Up program:

1. The State-Trait Anxiety Inventory (STAI) test [17] is used to evaluate levels of anxiety in two forms: personality trend and state anxiety. The anxiety state levels are expected to be more functional and stable after training.

2. The Beck Depression Inventory (BDI) test [18] is used to evaluate depressive symptoms. There are different levels depending on the results. The depression scores are expected to be lower after the study.

3. The Empathy Questionnaire (EQ) [19] is used to measure empathy difficulties. A higher level of social understanding is expected after training.

4. The Autism Spectrum Quotient (AQ) test [20] was used to measure its ASD characteristics. An improvement in their abilities in social interaction and reciprocity is expected.

3 RESULTS

3.1 First year

The first session was attended by seven individuals with an ASD (five males and two females), three of whom attended most of the subsequent sessions. One student attended only the first session and then left the program, but has shown regular attendance at college, while another also attended the first session before deciding to study at home and come to university to do only the final exams. One student left the university after a few weeks, while in the case of another, who also left the program, we have had no further information.

For this reason, the students were asked to comment on their experience in terms of what they had found helpful and if they had any suggestions about changes to the program in order to make it more useful. It should be born in mind that many of the students with an ASD do not wish to be identified and neglect to inform the university about their difficulties. Indeed, some of those who signed up for the program presented very extreme cases. It is necessary to ensure that students with an ASD feel enough confidence in the program to join it, without any concern other than acquiring tools that will help them in their university life.

In the short term, some changes in the face-to-face sessions were under consideration in order to accommodate students' suggestions. In addition, for the purpose of extending the availability of tools for students joining the program, the creation of an application for smartphones was planned to help in guidance within the campus. Furthermore, training and awareness-raising courses on ASD for the professors and administration staff of our university were designed and put into practice from June 2018.

3.2 Second year

Expected results for the second year are based on the statistical comparison of STAI, BDI, EQ/AQ test scores and qualitative assessment of overall edition by Meet-Up team, taking into account suggestions made by the students collected in the Closing session. At this point, the course is ongoing and questionnaire analysis will be addressed on July 2019.

4 CONCLUSIONS

Intervention in ASD at schools leads to an increase of high performance students in the university environment [21]. Glennon and Tara [22] highlight the following factors as important for obtaining optimal levels of autonomy during higher education in students with ASD: the process of adaptation and life in university life, social rules, commitment to academic activities and the management of life as an independent individual. Therefore, it can be useful to create a service of academic help and guidance groups at universities.
The society has improved in the diagnosis and intervention of people with ASD orientation; it’s crucial to continue offering intervention services in natural environments to stimulate their abilities by offering them spaces to work on their emotional states in an academic environment.

The Course Edition of the Meet-Up program for the academic year 2018-19 is in progress at the time of preparing this article. The general guidelines and strategy have been maintained with respect to the 2017-18 Course, but the analysis and assessment of the strengths and weaknesses made at the end of the First Edition (July 2017) as a result of the experience and critical discussion of the Meet-Up Team and the opinion of the students has led to the implementation of certain changes that were detailed in the previous sections. The accompaniment of university students with ASD in the Meet-Up program requires:

- Involving multiple agents (academic leaders, teachers, mentors, colleagues, among others).
- Centralizing the coordination in the Offices, units or services of attention to students with disabilities of the university (from now Office of Inclusion of the GI-UPC team).
- Having the advice and support of specialists in ASD who possess precise skills and technical knowledge about this condition. Some of the proposed supports are already offered at universities to students with disabilities. However, support for students with ASD requires special technical training because:
  a) They are multiple, wider and more diverse (often, they must simultaneously cover various areas of activity and environments).
  b) They require particularly detailed and systematic planning and monitoring, due to the psychological characteristics of these students (social deficiency, lack of spontaneity, cognitive and behavioural rigidity, difficulty in accepting changes, etc.).
  c) They are necessary for a long time (usually, for as long as the student remains in the university, but adjusted to the specific needs and needs of each year, activity, subject ...).
  d) They have to be designed ex-novo (they are not usually part of the supports that have until now provided universities to their students with disabilities, and clearly outgrow the scope of the university programs of action tutorial).
  e) They may sometimes require contacting or coordinating with colleagues at UPC and other professionals (e.g. therapists) who may be addressing issues and problems directly related to those that motivate the need for support.

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REFERENCES


