

Article

# Giving a Voice to Students with Disabilities to Design Library Experiences: An Ethnographic Study

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**Abstract:** Although librarians generally display an inclusive management style, barriers to students with disabilities remain widespread. Against this backdrop, a collaborative research project called Inclusive Library was launched in 2019 in Catalonia, Spain. This study empirically tests how involving students with disabilities in the experience design process can lead to new improvements in users' library experience. A mix of qualitative techniques, namely focus groups, ethnographic techniques and post-experience surveys, were used to gain insights from the 20 libraries and 20 students with disabilities collaborating in the project. Based on the participants' voices and follow-up experiences, the study makes several suggestions on how libraries can improve their accessibility. Results indicate that ensuring proper resource allocation for accessibility improves students with disabilities' library experience. Recommendations for library managers are also provided.

**Keywords:** inclusive research; students with disabilities; universal design; co-creation; accessibility



**Citation:** Cerdan Chiscano, M. Giving a Voice to Students with Disabilities to Design Library Experiences: An Ethnographic Study. *Societies* **2021**, *11*, 61. <https://doi.org/10.3390/soc11020061>

Academic Editor: Gregor Wolbring

Received: 24 May 2021

Accepted: 11 June 2021

Published: 15 June 2021

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## 1. Introduction

As non-special education schools and universities see growing numbers of students with disabilities on their campuses [1], the literature has turned its focus on library accessibility. There has been a call from the United Nations, by means of its Convention on the Rights of Persons with Disabilities [2], for service providers—including library managers—to offer people with disabilities (PwD) inclusive library experiences. States Parties recognise the right of PwD to take part with others on an equal basis in cultural life, and shall take all appropriate measures to ensure this (art 30 [2]). This is especially relevant considering that the PwD population is forecast to reach 120 million by 2030. [3]. Although libraries have made great strides in improving accessibility and inclusivity for PwD, issues still remain and students with disabilities are faced with fewer access opportunities than their non-disabled counterparts.

As a result of the current COVID-19 health crisis, organisations have been forced to rethink how they design their services, prompting them to develop new products and services. This is a unique opportunity for libraries to rethink and develop more inclusive experiences for PwD. Inclusive library experience design is key for social inclusion, with previous research bearing out the importance of including the voices of PwD when discussing the library-user experience [4]. Indeed, one way of enhancing inclusivity in libraries and other educational settings is by giving a voice to PwD [5–7] and librarians [8–10]. Interestingly, there has been a recent cascade of academic literature on the design of inclusive library spaces [11–13] and inclusive experience design [14,15], particularly exploring the use of new technologies as tools for stepping up inclusivity for PwD in libraries [16]. According to Kezuye [16], libraries, too, have taken steps to ensure equal access to digital resources for PwD.

Although research is now focusing on how to improve library accessibility and, for instance, ref. [17] have developed a conceptual methodology to aid libraries in co-designing library experiences with PwD, there is a lack of empirical research demonstrating the effectiveness of including their voices in this process. One way of harnessing the insights of students with disabilities as a tool for managing social inclusion in libraries is to embrace

the value co-creation marketing approach, whereby users' knowledge is gathered to learn how to improve their perceived level of service quality in accordance with their access and communication needs. With this approach, users become value co-creators [18]. To this end, service-dominant (S-D) logic is useful in improving user experience design, as it calls for collaboration among various stakeholders [19] and creates user value as a result [20].

In order to design better and more inclusive library experiences for students with disabilities, we draw on S-D value co-creation [20]. This recognised approach to improving user experience design calls for mutual collaboration and learning with the end-user and explains how to manage the process. In this way, it allows library managers to gain a deeper understanding of users' special needs and, in turn, to design positive encounters with students with disabilities. We turn to Payne, et al.'s [21] concept of encounters to frame our understanding of the co-creation process. According to this concept, three types of encounter take place between a service provider and its users: first, communication encounters, which refer to the ways in which a provider communicates with its users; second, usage encounters, or those in which users engage with a provider's facilities, services and products in the intended manner; and third, service encounters, which encompass any interaction between users and a service provider's staff or other users.

Although it is well known that the co-creation process yields positive management results, most companies are still uncertain about how to give a voice to PwD during the experience design process [17]. In this paper, we focus on encounters between libraries and students with disabilities (library users) that create inclusive value propositions for these students. We draw on the S-D approach to explore which encounters and practices prove more inclusive and create more value for students with disabilities [22,23] in the library context. In our model, we see students with disabilities as an operant resource and partner that actively interacts with the organisation to create value [24] in the form of enhanced library inclusivity.

In our view, this target approach will enable library managers to better allocate investments in the design of new library services and facilities that cater for students with disabilities. This entails designing with the user rather than for the user through peer collaboration.

With this study, we aim to shed light on how libraries can better manage the design of inclusive experiences by listening to the voices of students with disabilities, under the value co-creation concept put forth by Payne, et al. [21]. To date, the S-D logic approach has been empirically tested in libraries only rarely. We therefore seek to address this gap and expand the existing body of knowledge on how this approach plays out in different settings [25].

#### *Barriers and Disabilities in Libraries and S-D Value Co-Creation*

Our study draws on [26], the United Nations Convention on the Rights of Persons with Disabilities [2] and the social approach, which defines disability as the result of complex interactions between individuals and the service environment [27]. This perspective links well with the understanding of the environment as an external constraint in disability [28].

Despite advances in removing barriers to library access and in establishing universal design as the ideal process for creating new products, services, facilities and systems that can be used by all [29,30], such barriers are still widespread [11–15].

Thus, there remain several challenges to library accessibility that merit research. Although libraries have become more knowledgeable and aware of how to cater for students with disabilities, accessibility features largely fail to meet PwD's needs, specifically due to poor lighting, restrictive rules, lack of adapted communication systems and unsuitable signage [11–15,31].

One way of improving students with disabilities' library experience is by giving them a voice; that is, by actively involving them in the value co-creation process [22]. By listening to these users, libraries can gain insight into the encounters where accessibility barriers might exist and make changes to improve the library experience.

Products developed in mutual collaboration with end-users score relatively high in terms of fulfilling personal needs. As such, products developed with PwD create better value than those developed for them [32].

Very few authors have explored how the co-creation process might work in libraries [17,25]. Nevertheless, while previous research on co-designing with PwD has reinforced our knowledge of accessibility and the library context, there is a lack of empirical evidence validating whether including the voices of people with disabilities—and particularly students with disabilities—can help to create value for this group, so preventing the process from becoming a simple brainstorming exercise.

The co-creation process entails users' active participation and collaboration with the service provider, all the way from identifying a challenge to implementing and tracking the performance of its solution. On that basis, by fully collaborating with end-users and taking their access needs into account, providers are able to personalise the service they offer without investing many resources.

Previous studies have suggested that value co-creation is a useful tool for creating in-experience value [33]. Meanwhile, several authors have identified three types of value outcomes in the value co-creation process: emotional, social and functional [34,35].

Enriching mutual collaboration between end-users and service providers and, as a result, developing new inclusive products and services is key to creating value during experience co-design [20]. In this way, end-users become co-producers of value [36]. However, some authors warn that this process, when improperly managed, can lead to end-user dissatisfaction [37]. Logically, libraries must consider the access needs of students with disabilities when developing new products or services aimed at improving accessibility. At present, however, the benefits of the co-creation process are difficult to measure [38], hence the need for further empirical evidence to support such assumptions [39]. This is essential given how effective the value co-creation process has proven to be when users are involved [38].

With this background, we pose the following two research questions:

RQ1: What should library managers do during the value co-creation process to give students with disabilities a voice and thus ensure good library experiences?

RQ2: Which critical encounters create the most value for students with disabilities in terms of offering an inclusive library experience?

In the next section, we explain our methodology and present our results. We finish by making several recommendations for library managers.

## 2. Materials and Methods

We seek to identify the encounters in the value co-creation process (communication, usage and service) that lead to the most accessible library experiences and to ascertain what value outcomes these yield for students with disabilities. To this end, we followed an inductive, qualitative research method focused on Girona Provincial Council's library network in Catalonia, Spain.

The following stakeholders were given a collaborative role in the project so as to enrich our exploration of solutions to accessibility issues: the director of Girona Provincial Council's library network, the individual managers of the 20 libraries in the network, two people from associations for PwD (Aprenem and Dincat Plena Inclusió) and 20 students with disabilities.

We conducted our research project on the 20 Catalan libraries, entitled "Inclusive Library Project in Catalonia, Spain, 2019" (link hidden for anonymity), in the city of Girona between January and July 2019.

Figure 1 shows the map of libraries in Catalonia belonging to Girona Provincial Council.

Despite the fact that Girona Provincial Council's library network [40] made 75% of its libraries accessible to people with physical disabilities, many accessibility issues still remain.



Figure 1. Map of libraries in Catalonia belonging to Girona Provincial Council.

### 2.1. Project Design

With this research project we set out to accomplish two aims: first, to explore which critical encounters in the library experience generate the best value for students with disabilities living in Girona and, second, to aid library managers in allocating their resources properly to remove any prevailing barriers. To this end, the research project was split into three phases: in Phase 1 we held five focus groups; in Phase 2 we applied ethnographic techniques on 5 library visits with 20 students with disabilities and 20 library managers; and in Phase 3 we administered a post-visit experience survey to the 20 participants with disabilities. The official institutional ethics approval number is Girona Provincial Council exp-P170000A. Figure 2 below shows the project design breakdown and timeline.

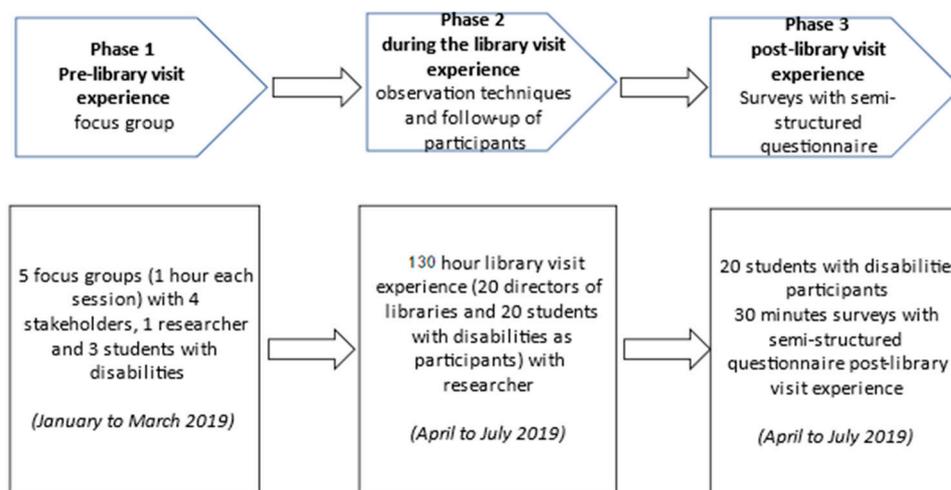


Figure 2. The project design breakdown and timeline.

A consent form was signed by all the project participants before the experience took place. With the consent form participants were informed through their association representative of PwD why they were invited to take part in this project, what did taking part involve, how were visit registrations managed, how data would be treated confidentially, who to contact in the event of any questions being asked, and their right to withdraw at any stage of the research project and keep their participation anonymous.

### 2.2. Participants

The participants were selected by the PwD association Dincat Plena Inclusió and by some libraries where participants were frequent users. According to our selection criteria, we were looking for 20 students, preferably between the ages of 18 and 25 years, who lived in the Girona rural areas and were frequent or occasional library users. These students attend their secondary schools or special education schools, where the majority do not have a service library, therefore, they visit public libraries along with their schools or caregivers

to involve community activities in their daily life. Table 1 shows a description of the sample of PwD.

**Table 1.** Sample of participants with disabilities.

Participant	Library Visit	Type of Disability	Gender	Age	Level of Disability
P1	Library 1	Intellectual	Male	18	Mild
P2	Library 1	Intellectual	Female	23	Mild
P3	Library 1	Intellectual	Male	21	Mild
P4	Library 1	Physical	Female	28	Mild
P5	Library 2	Physical	Male	32	Severe
P6	Library 2	Intellectual	Male	19	Mild
P7	Library 2	Deafness	Male	18	Severe
P8	Library 2	Intellectual	Male	22	Mild
P9	Library 2	Intellectual	Female	23	Mild
P10	Library 3	Intellectual	Male	25	Mild
P11	Library 3	Intellectual	Female	24	Mild
P12	Library 3	Intellectual	Male	21	Mild
P13	Library 3	Intellectual	Female	18	Mild
P14	Library 3	Physical	Male	19	Severe
P15	Library 4	Physical	Male	20	Severe
P16	Library 4	Deafness	Male	22	Severe
P17	Library 4	Intellectual	Male	23	Mild
P18	Library 4	Visual	Male	25	Severe
P19	Library 5	Intellectual	Female	21	Mild
P20	Library 5	Intellectual	Female	19	Mild

### 2.3. Data Collection

Drawing on Payne et al. [21] and previous literature on barriers to library accessibility, we aimed to determine what encounters proved to be the most inclusive and created the most value for students with disabilities.

#### 2.3.1. Phase 1: Focus Groups and Encounters

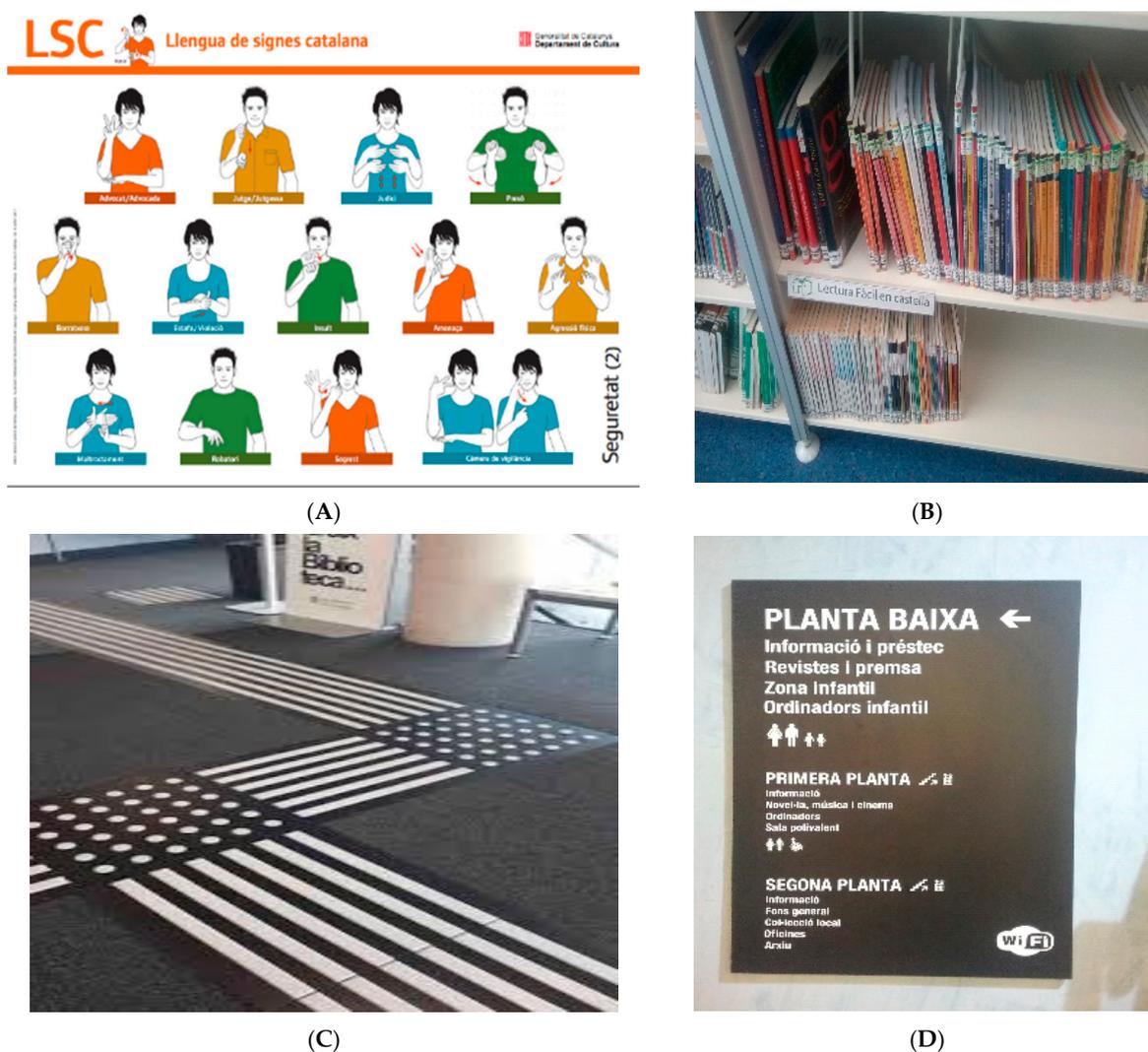
In Phase 1, the lead researcher conducted five focus groups with various stakeholders, which were recorded and transcribed [41]. Three out of the twenty participants in Phase 2—P14, P18 and P19 (see Table 1)—took part in the focus groups, alongside two members of the Barcelona Provincial Council’s library service and two people from the aforementioned associations for PwD. The participants who took part in Phase 1 were invited to do so by the PwD association and stated their willingness to participate.

The focus groups were conducted before moving on to Phase 2 (the library visits) to brainstorm ideas among stakeholders around potential solutions for removing library accessibility barriers, such as adapted products, facilities and services. The ideas deemed good enough to be implemented by libraries with the support of Girona Provincial Council’s library network were developed and later tested by the participants in Phase 2.

The goal of focus groups 1 and 2 was to identify any barriers that students with disabilities currently run into in their experiences using the library. For this, we drew on previous literature and the stakeholders’ own knowledge and experience. Subsequently, in focus groups 3, 4 and 5 we aimed to come up with innovative solutions that would improve students with disabilities’ critical encounters in the library experience.

Although all ideas were considered, it was essential to work out their investment and resource feasibility, so as to adapt existing services, products, facilities and systems without overreaching. These adaptations, to be tested in Phase 2, were discussed with and carried out by Girona Provincial Council in collaboration with the lead researcher. For example, a training programme for library staff was deemed relevant [42] and implemented before Phase 2, with 50 library staff completing the four-hour course. While it was relatively easy to roll out this action, the idea to change the inaccessible entrance door at one of the libraries was turned down for the time being due to the costly investment that it would have required.

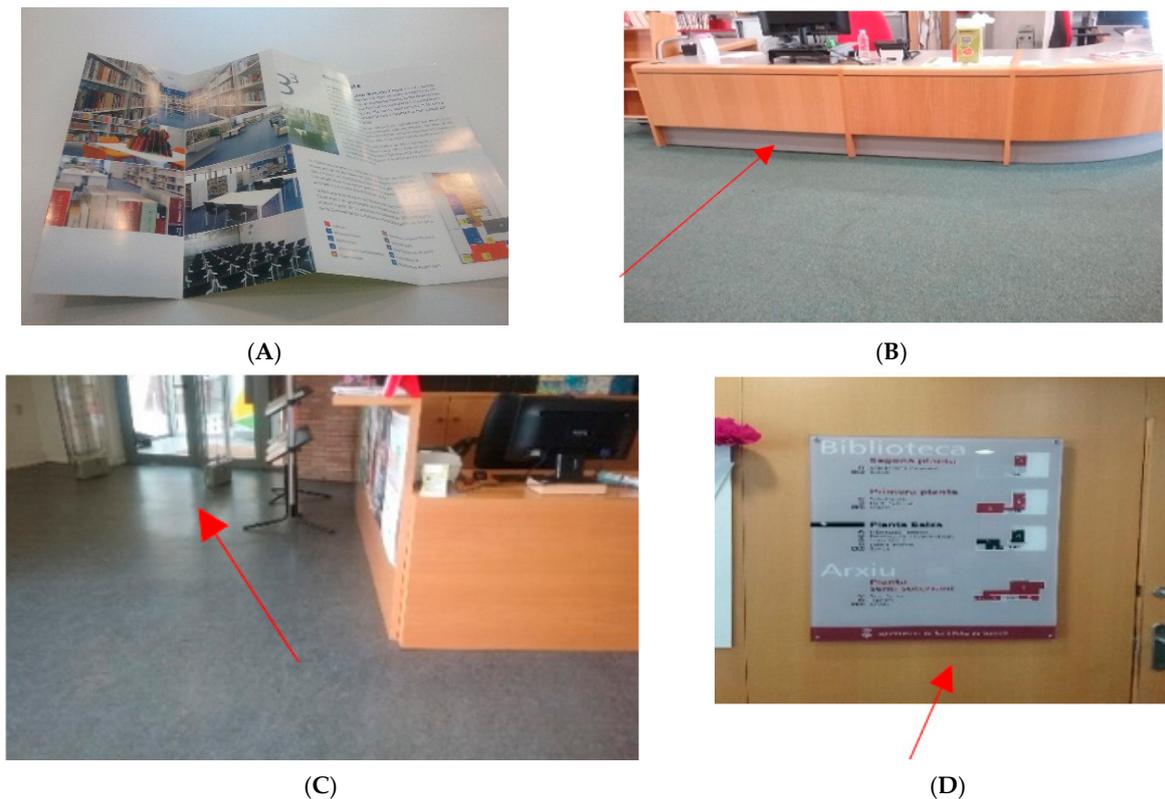
Figure 3 Identified and tested adaptation examples.



**Figure 3.** (A) Sign language displayer for library staff implemented in all the libraries. (B) Acquisition of a huge portfolio of books in plain language for students with intellectual disabilities. (C) Podotactile bands implemented in libraries for blind students. (D) Signage posting adapted to Universal Design standards to the communication needs of users (plain language, contrasting colours, etc.).

The ideas arising in Phase 1 that were deemed both good and feasible were developed by the library managers with the support of the Girona Provincial Council and then tested by our study participants in phases 2 and 3. Figure 4 below shows examples of adaptations made to communication and usage encounters.

By the fifth focus group, the brainstorming process had been exhausted [43] and failed to produce new ideas.



**Figure 4.** Accessibility challenges identified throughout the project in the library’s physical space and in communication encounters. (A) Library guide needs to be adapted to the communication needs of users (plain language, Braille, etc.). (B) Some libraries lack physical accessibility features. (C) There is a lack of tactile bands in libraries. (D) Signposting needs to be adapted to the communication needs of users (plain language, Braille, etc.).

The following main ideas were collected in phase 1 and further developed and tested by participants in phase 2 and phase 3 in some of the 5 libraries tested.

1. Communication:

- Library accessibility guide in adapted formats
- Signage in plain language
- Signage in Braille
- Library map in tactile and Braille format
- Online and offline information provision in adapted format

2. Service:

- Staff provided with accessibility to a two-day training program
- Inclusive activities
- Assistive dog entrance
- Availability of sign language

3. Usage:

- Portfolio of books in plain language
- Use of tactile bands for better navigation in the library
- Available quiet areas
- Lifts, ramps and entrance desks adapted to PwD’s access needs (universal design)
- Screen readers and accessibility software
- Assistive tools for reading (augmentative loops, etc.)

### 2.3.2. Phase 2: Data Collection on the Library Visits

In Phase 2, the researcher shadowed the 20 participants during their visits to the 5 selected libraries and collected relevant information about their opinions, emotions and

behaviour. Observation techniques were used for this, resulting in 240 photographs and many handwritten notes. We strove to ensure that the collected information was relevant to the participants' library visit experience [44].

Figure 4 below display several accessibility challenges identified throughout the project in the library's physical space and in communication encounters.

### 2.3.3. Phase 3: Post-Library Experience Surveys

At this point in the data collection, an expert accessibility consultant had audited the 20 libraries and the lead researcher had shadowed the 20 participants on their library visits. Next, these same participants were invited to answer a semi-structured survey about their library visit experience and their perception of the value outcome. All 20 participants agreed to take part, and the surveys, which lasted around 30 min, were conducted individually.

The surveys were focused on participants' perception of the accessibility of the libraries visited. The survey was based on previous literature on the three main encounters between users and service providers. In this framework, as explained above, the information offered to users is considered a communication encounter; usage encounters are those in which adapted facilities and services are provided, including adapted multi-format books or computer software; and, finally, any interactions with the physical environment and the library staff are labelled service encounters. Participants' impressions relating to the provision of library resources and facilities for accessibility and their perception of their interaction experience with library staff were recorded; and for the visit, there were open and qualitative questioning strategies designed to let interviewees play an active role and explain their own narrative.

After the accessibility audit of the sample of 20 libraries and the 5 library visits with the 20 students with disabilities, conducted from an inclusive research perspective [45,46], the researcher reporter enough insights to give an answer to the research questions.

### 2.4. Data Analysis

A relational map with codifying data [47] was created using ATLAS.ti upon completion of the fieldwork. We drew on previous literature [15,48] to perform the data review. Specifically, we carried out a qualitative thematic analysis [49] using a coding process in the first phases thereof. Three main categories emerged from our study of the value co-creation process, which coincided with the three encounters explained above [21], and we employed in-depth data coding. Finally, concepts taken from our literature review guided us in identifying the main themes and axial coding. Table 2 shows the coding process.

**Table 2.** Coding process.

Open Coding	Axial Coding	Main Themes (Selective Coding)
"I couldn't find my favourite DVD music records and I sometimes have trouble communicating with others. The library staff were very patient and of great help to me in retrieving what I was looking for." (P8)	Interaction with library staff and other users (service encounter)	The attitude displayed by library staff plays a role in ensuring inclusivity in libraries
"It was difficult for me to understand how the loan service worked, so the library provided me with visual information in plain language. It was much more understandable. I was not aware that books should be returned to the library in a few days' time . . ." (P1)	Information provision and signage (communication encounter)	Providing information that is adapted to the communication needs of PwD plays a role in ensuring inclusivity in libraries
"We were given a tactile and Braille library map, and it was easier to move around the library . . ." (P18)	Universal design and resources for accessibility (usage encounter)	Adapted resources and the adoption of universal design play a role in ensuring inclusivity in libraries
"There was augmentative software on the computers for easier reading, which helps us to improve our computer use . . ." (P3)		
"We were delighted to take part in this study, since I feel like we have uncovered needs and we would like to have improvements so that we can enjoy easy access. I deeply appreciate this opportunity to voice my ideas on how to improve our accessibility. Hopefully the library can go ahead with these ideas . . ." (P1, P3, P10, P18)	Designing with PwD	Highlights the importance of giving a voice to PwD before the experience takes place

### 3. Results

Table 3 shows critical features of the encounters in an inclusive library experience to aid users with different categories of disability.

**Table 3.** Critical features of the encounters.

Encounter	Critical Encounter	Physical Disability	Sensorial (Hearing, Vision)	Cognitive Impairment
Communication encounter Communication aids	An adapted library accessibility guide (information on adapted services, facilities and products) available in plain language, visual format, QR codes with audio description and Braille.	x	x	x
	Signage in plain language and Braille with QR codes available.		x	x
	Adapted information available online explaining the library regulations (loan service, inclusive activities, timetable, etc.)	x	x	x
Usage encounter	Lifts, ramps and entrance desks adapted to PwD's access needs (universal design).	x	x	x
	Screen readers and accessibility software		x	
	Assistive tools for reading (augmentative loops, etc.)	x	x	x
Service encounters	Portfolio of books in plain language			x
	Available quiet areas	x	x	x
	Use of podotactile bands for better navigation in the library		x	
Service encounters	Availability of sign language		x	
	Ongoing training programme (staff attitude)	x	x	x
	Inclusive activities			
Service encounters	Access for PwD's guide dog	x	x	x
			x	

The encounters were tested with students with disabilities in the library service environment. The aim was to explore the touchpoints that generated the most inclusive value for participants and thus help library managers to successfully design inclusive library experiences. The major library users from the disabled segment were found to be students with intellectual disabilities, physical disabilities or hearing impairment. Interestingly, users with vision impairment were found to be low-frequency library users. This group's scant use of libraries likely boils down to a few key factors, namely the general lack of resources in libraries, shortcomings in the walking aid provided to help such users maintain their bearings, the small number of books available in Braille and recent advances in digital libraries. Naturally, students with low vision are more inclined to frequent libraries when relevant resources, such as magnifying glass loupes and assistive computer programs, are provided. For the segment of users with hearing impairment, visual signage such as visual emergency warnings and the availability of audio induction loops was found to meet their needs.

The participants in our project expressed great satisfaction with our initiative to improve the library service with their help and were happy to take part in the library visits. If we learned anything from this project it is that giving a voice to students with disabilities and involving them in the co-creation process gives rise to new ideas for ensuring inclusive library experiences and, importantly, a mutual process of learning and knowledge sharing. This strengthens the relationship between library staff and users with disabilities in the value co-creation process. For example "The library improved its signage "The library improved its signage and we were given an adapted tactile and Braille map, so we were very satisfied with the improvements and appreciate that the library has become more inclusive and taken our inclusivity needs seriously" (P18).

Considering the mobility effort that participants with disabilities have to make to take part in projects like ours, it is crucial that their expectations in terms of accessibility improvement are met. In the case of our study, 85% of the participants reported in Phase 3 that they were quite or very satisfied with their library visit experience.

Table 4 Responses from the surveys of the value of ideas coming out in phase 1 and further implemented for students with disabilities. Participants were encouraged to give their opinion on the value of the implemented resources on accessibility.

**Table 4.** Responses from the surveys.

Inclusive Resources	Critical Encounter	Value Outcome for FwD
Communication aids (accessible library guide, online and offline accessibility information, signage postings in adapted formats, etc.)	Communication	positive (95% of respondents)
Universal design application to the physical environment		Positive (95% of respondents)
Screen readers and accessibility software		
Assistive tools for reading	Usage	Positive (25% of respondents)
Portfolio of books in plain language		
Available quiet areas		
Use of tactile bands for better navigation in the library		Positive (75% of respondents)
Interaction with library staff		Positive (95% of respondents)
Inclusive activities	service	Positive (75% of respondents)
Sign language availability		Positive (25% of respondents)

Our research sheds light on two previously unaddressed facts: (1) involving students with disabilities in the design experience from the beginning helps to make them an operant resource in the value co-creation process, and (2) designing inclusive encounters with students with disabilities brings the most value to their library experience.

Our findings show that even reasonable adjustments, when they are the right ones, can have a big impact on inclusivity in libraries. The adjustments made to the three encounters (communication, usage and service) in our project proved to be of high value for the students with disabilities in their library experience. Specifically, our data analysis yielded valuable insights regarding the improvements that libraries should make to become more inclusive of students with disabilities, as well as the features of their encounters with such students that should be considered most critical for accessibility.

### 3.1. Communication

Having adequately adapted online and offline information and communication in place about the library's timetable, the loan service and inclusive activities was shown to be highly relevant. This could come in the form of a library guide that is adapted to the communication needs of each segment. For instance, one of the participants with an intellectual disability reported that she was once told by the library that she was not complying with its book return policy. She became overwhelmed as she did not understand how the loan system worked and found the information available very complicated and full of complex language. Another participant with vision impairment was relieved when the library began allowing access to guide dogs on its premises (this idea coming from phase 1 focus group).

Making adaptations using plain language, QR codes and Braille to communicate the library's service regulations was shown to increase the personal autonomy of students with learning difficulties. Therefore, this is a relevant way to fix the lack of adapted or otherwise suitable information in communication encounters (this idea coming from phase 1, 2 and 3).

Table 3 shows the results of the data analysis, specifically which features of the critical encounters provided students with disabilities the most value in their inclusive library experience. When designing experiences, libraries should provide students with disabilities with these resources depending on the nature of their disability.

### 3.2. Usage

Although public services and libraries have made great advances in improving physical accessibility, the students with disabilities in our study continue to perceive important barriers to the physical service environment (see Figure 4). The main issues identified are the entrance, emergency exit doors, stairs and lifts, which needed several adjustments to comply with standard accessibility regulations. Interestingly, the main issue is the lack of signage in Braille in lifts and on emergency exit signs (this idea coming from phase 1 focus group). Libraries' compliance with this is highly recommended and will likely increase students with disabilities' perception of accessibility. Importantly, support tools for reading, such as augmentative loops for low-vision readers and augmentative tools for assistive computers, were missing (this idea coming from phase 1 focus group). One of the critical elements in this encounter is for students with disabilities to be able to easily navigate the library to find their adapted book choices (this idea coming from phase 1 focus group). The libraries in our sample had different criteria for where to place adapted books. While some libraries displayed them in a specific place indicated for social inclusion, others were more prone to avoid the word inclusion and grouped the books (adapted or non-adapted) by thematic areas. When this second strategy—a result of library managers' intention not to distinguish by user type—was employed, users with disabilities were found to require extra assistance in finding the adapted books they were looking for, thus losing a great deal of personal autonomy (these ideas coming from Phase 1, 2 and 3).

### 3.3. Service

The results of the focus groups suggest that staff are quite aware of how to communicate adequately with students with disabilities (this idea coming from phase 1 focus group). One critical point is that students with disabilities normally visit libraries in groups from the associations for PwD. Training library staff and providing them with a handbook on how to properly communicate with students with disabilities are key factors.

## 4. Discussion

Through our study of libraries in Girona, Spain, we shed some light on how to design more inclusive library experiences for students with disabilities using the S-D logic approach, otherwise rarely used to date. In order to give a response to the research questions, we empirically demonstrated that successful library design improvements are feasible with few resources when students with disabilities are involved and given a voice through mutual collaboration with libraries using a target approach.

We concur with Yücel (2016) and other authors in that several challenges remain with regard to library accessibility, and that these challenges merit research. Although libraries have become more knowledgeable and aware of how to cater for students with disabilities, accessibility features largely fail to meet PwD's needs, specifically restrictive rules, lack of adapted communication systems and unsuitable signage. We demonstrated that libraries must consider the access needs of students with disabilities when developing new products or services aimed at improving accessibility.

The results of the qualitative study found that the implementation of solutions on accessibility with Universal Design has a strong effect on the perception of satisfaction with the library visit experience. Obviously, library managers need to facilitate access to resources for accessibility. For example, using adapted online and offline communication resources, staff awareness and inclusive activities based on individual user preferences. It is relevant for libraries to understand what their target users' needs are before determining the experiential values are resources for accessibility to be delivered in order to create a close alignment between service design and the level of satisfaction of students with disabilities.

In response to RQ1—what should library managers do during the value co-creation process to give students with disabilities a voice—tellingly, we show that the inclusion of students with disabilities in the value co-creation process and true collaboration from both sides lead to good insights into library accessibility. Thus, rather than merely considering

the opinions of students with disabilities, the library redesign process needs to really listen to what they have to say. This mutual collaboration with students with disabilities allows libraries to gain a better understanding of the issues they may be facing and take action to successfully address them. Otherwise, students with disabilities will continue to encounter serious barriers in their library experience. For students with disabilities to become operant resources in the co-creation process [24] they need to be provided with adapted communication throughout the process to avoid the negative outcomes described by [50] and [51]. In response to RQ2—which critical encounters create the most value for students with disabilities in terms of offering an inclusive library experience:

The process can help library managers to achieve two goals: first, it can better identify the adjustments required to improve the library experience of students with disabilities, and secondly, it can improve the students with disabilities' perception of inclusion in their accessible library experience.

## 5. Conclusions and Practical Implications

The emphasis of this study is on the use of design tools to explore, observe and understand experiences involving students with disabilities, to identify and solve problems arising from their community library experiences, and to design for better experiences.

Our findings can be employed by library managers to successfully design inclusive encounters and relationships with students with disabilities in their libraries.

We identified some ways in which our results can be used:

They can aid library suppliers in developing new products or services, such as helpful technologies. They can help library managers to understand that encounters should be designed with the access needs of students with disabilities in mind. Finally, students with disabilities can effectively contribute to improving usage and service by assisting in the design process.

Additionally, the results of our study confirm that when managing the value co-creation process [21], students with disabilities should be involved from the beginning as key stakeholders. We demonstrated that students with disabilities, when provided with adapted resources, become a relevant operant resource in the value co-creation process and a great source of insights into how to improve their library experience. We confirmed what Chathoth et al. [52] studied—i.e., that the value co-creation process can be maximised to generate value for users—and, importantly, observations that giving a voice and empowering PwD as stakeholders is critical to generating value in the S-D co-creation process.

As with any study, the authors recognise the limitations of this research, as qualitative data was collected from one destination and limited to before and during the library experience. These results must be carefully considered as the first approach to S-D co-creation processes with students with disabilities, in order to reduce barriers in libraries for this group.

Finally, using the value co-creation process when designing new library experiences and involving students with disabilities creates a unique opportunity to strengthen relationships with users with disabilities and improve their level of library service satisfaction. Improvements and adaptations made to library services, facilities and systems with students with disabilities should include adaptations to the physical environment (floor signage, use of Braille signs at ramps and lifts, proper lighting), attitudinal staff improvements (training programmes), and information and communication adaptations such as support materials in visual and plain language to ensure inclusion. Solutions to improve encounters with students with special needs must be tested before being implemented.

**Funding:** This research received funding support from COCEMFE-UOC Chair in Personal Autonomy and Digital Health and the Girona Provincial Council's library network.

**Institutional Review Board Statement:** The study was conducted according to the guidelines of the Declaration of Helsinki. All participants signed a consent form.

**Informed Consent Statement:** Informed consent was obtained from all subjects involved in the study.

**Data Availability Statement:** Data is partially contained within the article. While we have included in the article a number of photos, these are not pictures of the respondents, in order to avoid them being identified the vulnerable group they are.

**Acknowledgments:** This research received the external support of COCEMFE-UOC Chair in personal Autonomy and Digital Health. We thank our colleagues from Dincat-Plena Inclusió association and Girona Provincial Council's library network in Catalonia for their support.

**Conflicts of Interest:** There are no conflicts of interest.

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