

# Dyslexia in SNS: an Exploratory Study to Investigate Expressions of Identity and Multimodal Literacies

YVONNE VEZZOLI, Ca' Foscari University of Venice  
ASIMINA VASALOU, UCL Knowledge Lab  
KASKA PORAYSKA-POMSTA, UCL Knowledge Lab

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The paradigm<sup>1</sup> of neurodiversity provides a theoretical scaffold to challenge the idea of dyslexia as a deficit, by considering how difficulties related to literacy may reflect possible cognitive strengths and opportunities for learning. In this paper we adopt this perspective which associates dyslexia with strengths in visual, oral and three-dimensional thinking. Our goal is to understand if and how the multimodal affordances of SNS mediate participation and new literacies for dyslexic youth, and how these affordances interact with identity work. Seven young people struggling with literacy were interviewed about their use of SNS. Our results show that the visual affordances of SNS enable new forms of participation and expression, furthering our understanding of *visual* literacies. Nonetheless, despite the pervasive use of visual affordances to perform identity work, we also find that young people's learning differences are not always obviated but re-constructed, or even confronted in SNS.

## ACM Classification Keywords

H.5.m. Information interfaces and presentation (e.g., HCI): Miscellaneous; K.3.0. Computer and education: General; K.4.2. Computer and society: Social issues: Assistive technologies for persons with disabilities

## KEYWORDS

Dyslexia; Learning Difficulties; Neurodiversity; Social Model of Disability; Social Network Sites; Visual Literacies; Inclusive Design.

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## 1 INTRODUCTION

One of the most challenging life transitions for young people is the passage to secondary school. While support is usually removed, academic responsibilities increase. It is during this time that students' self-concept and self-esteem can sharply decline [16]. This decline can be even more drastic for those who have dyslexia and often enter secondary school with poor reading and writing skills. The interaction between the expectations of formal schooling and dyslexia can affect dyslexic students' academic experience [44]; it can incur negative consequences to their self-esteem, the development of a sense of identity [14], and more broadly their life-long prospects [1]. According to Vygotsky [54] these social consequences, experienced as a result of one's primary disability, turn into secondary impairments. Despite the likelihood of incurring

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secondary impairments during the years of formal schooling, it is through this route that young people with dyslexia are most likely to ascertain their academic and working future.

Previous research into dyslexia has been driven by a medical view that interprets dyslexia as one of many neurodevelopmental disorders that persistently impedes the ability to learn or apply academic skills [2]. The medical view on this specific learning difficulty assumes a deficit at the phonological level of processing impeding adequate acquisition of the grapheme-phoneme correspondence necessary for learning to read in an alphabetic system [48]. This results in an unexpected, specific, and persistent failure to acquire efficient reading skills. The medical view on dyslexia has inspired research on design and evaluation of Assistive Technologies as a possible means to bridge the gap between poor and skilled readers. Examples include speech synthesis components [29], assistive software [35] and mobile applications [40] the aim of which has been to compensate for the lack of basic literacy skills [20].

While this research has been important in supporting students to participate within the boundaries of formal education and their traditional text-based literacies, it has also tended to approach technology as a tool that can ‘solve a problem’ rather than as one that offers new and different opportunities for expression and learning. The goal of our paper is to explore an alternative *multimodal* perspective on literacy and to understand how it may be accomplished. Increasingly new media facilitate a broader range of expression modes such as images, symbols, artifacts and other visual symbolic representations privileging more than the printed word [26]. As a consequence, Gee points out [25] that digital environments, such as videogames or social media, require individuals to expand their competencies to multiple literacies which has been termed *multimodal literacies* [31][37].

Among the new media that offer a diverse range of different modalities, social network sites (SNS) represent a critical case. SNS environments are characterized by the normative use of expressive means such as images, videos, or emoji in addition to text. These affordances of SNS together with the high motivation underpinning their use, especially by adolescent users [12], make them good exemplars of platforms for understanding the practices employed in the environments where multimodal communication is already prevalent. When considered from the perspective of dyslexia, SNS and the multimodal literacies that govern their use also highlight how difficulties related to the written word may be also accompanied by possible cognitive and visual strengths [6]. This balanced point of view on potentials and weaknesses is in line with the neurodiversity paradigm, which theoretically reframes the idea of dyslexia from a literacy deficit to a difference (also see [42] who explore this through a critical design approach). According to this holistic view, dyslexia represents one of the possible neurotypes in the spectrum of neurodiversity [3][4] within which each neurotype involves specific patterns of weaknesses and strengths.

In this paper, we take this neurodiverse view of dyslexia. We report on a qualitative study on how young people with literacy-based difficulties aged 14-16 naturally approach and communicate in two SNS: Facebook and Instagram. To the best of our knowledge, this is the first study that aims to investigate the practices employed in SNS contexts by dyslexic youth. Dyslexia manifests itself across languages in different ways depending on the consistency by which phonology is represented in orthography [58]. Considering the lack of such consistency in English, our study takes place in the UK where it is estimated that dyslexia affects as much as 4%-8% of the population [49].

The contributions of our research are two-fold. First, we add to the broader understanding of SNS affordances through an examination of their multimodal features, considering how they mediate the online participation of those with dyslexia. Our work reveals a strong preference for *visual* modalities by dyslexic youth. This finding extends existing deficit views on dyslexia to emphasize the visual strengths and potential of the individuals who struggle with the written word. From this work, we draw out implications for inclusive design and future educational implications for visual literacies. Second, we contribute to the theoretical understanding of identity and self-presentation by looking at how a group, often negatively differentiated from their peers, negotiates identity online. We show that some young people use SNS to develop narratives about their experience with dyslexia. Yet others approach it as a forum to reclaim power over their peers and to gain fame by showcasing their strengths. Despite the pervasive finding that dyslexic youth use the multimodal affordances of SNS strategically and reflectively to perform identity work, we also find that their

learning differences are re-constructed or even confronted as a result of the complex social interactional dynamics they experience within SNS.

## 2 BACKGROUND

### 2.1 Opportunity of SNS for dyslexic students

Facebook remains the most popular SNS amongst teenagers in the UK. In a 2014 survey of 500 children in the UK, 55% of users aged 13-14 and 64% aged 15-16 reported having an active profile [38]. In the same report, Instagram ranked second in popularity with an active user base of 19% of users aged 13-14 and 21% aged 15-16 [38]. Since Instagram's recent acquisition by Facebook, its popularity among young people has been continuously growing together with Snapchat [32].

Although the uses and practices of SNS by young people have been well documented in the literature (e.g. [10][11]), the potential opportunities afforded by SNS and the digital practices of dyslexic individuals have received limited attention. One exception is research by Barden who co-constructed a new Facebook group with dyslexic students aged 16-19 intended to facilitate their learning [6][7][8]. His results show that young people perceived Facebook to be a desirable and inclusive technology in their education [8]. This was attributed to the social and collaborative nature of Facebook which was found to promote a sense of shared identity among the participants, strongly influencing their identity and engagement with texts [6]. As a consequence, Barden concluded that Facebook may engage dyslexic students in active and critical learning about and through multiliteracies [7].

Barden's research is significant in two ways. First, it departs from the deficit view that dominates research on special education needs and technology [46], by showing the enabling opportunities afforded by SNS. It also specifies practical implications for education in identifying a new forum for engaging dyslexic students. Whereas Barden's work was primarily concerned with students' perceptions of learning, the goal of the present study is to consider how particular affordances within SNS contribute to the construction of new forms of communication and literacy, which may "level the field".

### 2.2 SNS affordances and multimodal literacies

SNS are characterized by design affordances that shape online identities and interactions. Drawing from Faraj and Azad's definition, DeVito et al. [18] describe affordances as "*the mutuality of actor intentions and technology capabilities that provide the potential for a particular action.*" Given DeVito's interest in self-presentation, the same authors identify a set of social media affordances involved in identity work online. In a similar vein, Morioka et al [45] investigate the role of SNS in facilitating students' identity transition from high school to college. In doing so, they motivate a case for focusing on two SNS affordances to understand identity curatorship, *asynchronicity* and *selective self-presentation*.

The present work extends the understanding of SNS affordances by focusing on the role of *multimodal* affordances in shaping the participation and expression of dyslexic youth online. Multimodal affordances embedded in SNS foster contemporary literacies that require the ability to express and understand ideas across a broad range of different systems of representation and signification. As Jenkins points out [31], this tendency towards multimodality [37] gives young people the ability to identify the most effective modalities of expression to reach their audience and the best techniques in conveying information through each channel. Thus, SNS users must be equally adept at reading and writing through images, texts, sounds, and simulations [31], contrasting with the narrow view of literacy based on the written word.

A multimodal perspective on literacy is particularly significant for the social inclusion of dyslexic youth. A few studies have been conducted on the strengths in visual, oral and three-dimensional thinking – all of which are orchestrated during multimodal literacies – as part of the cognitive and learning style of the dyslexic brain (e.g. [5][22][26]). Moreover, the holistic view posited by multimodal literacies reflects a social model of disability, which would recognize that the socio-cultural environment *creates* dyslexia through its dependence on the written word [17][39]. Thus, our point of departure is to argue that the multimodal affordances of SNS may provide a new space through which we can understand the generative role of

potentially enabling technology i.e. technology employing new literacy practices that are not premised on the value of *normalization*. Accordingly, our first question asks:

*RQ1: How do multimodal affordances of SNS mediate participation and new literacies for dyslexic youth?*

## 2.3 Identity and its relationship to literacy

Although identities are personally lived by individuals, they are also socially constructed online and offline as individuals construct and manage a ‘*discourse-identity*’ within a social group [10][11]. Discourse-identities represent ways of being, belonging and being recognized [6]. They are partially sustained through literacies [11], grounded on community involvement and the participatory culture [31]. Therefore, identity is not only the manifestation of an individual’s expression, personal state or disposition. It is more broadly a collaborative and collective entity mediated by SNS, which engenders presentation and narration [41] through literacies that involve new forms of *multimodal* consumption and production.

Previous empirical research has examined different facets of identity by considering the opportunities and constraints of SNS. For example, Litt et al [36] argue that face threats to identity can be collective. In line with this, they show that face threats do not only result from self disclosure, but also follow from friends’ sharing behaviors. Mallan [41] considers how youth engage in subtle authenticity negotiations around their identity in SNS. Self-presentation forms part of a performance toward one’s current audiences, but also future ones as young people imagine their identity work to be ‘discovered’ leading to new opportunities for fame and recognition.

Young people experiencing adolescence are re-shaping their identity and, as a result of this, are susceptible to influences from peers and role models [6]. Dyslexic students come into this age period with a history of academic avoidance and rejection of reading and writing that can have negative long-term effects on their sense of identity, and more broadly on their educational and life chances (e.g. [1][14]). Thus, in adolescence, dyslexic individuals are particularly vulnerable as they must negotiate their differences against their desire to ‘fit in’. The current study seeks to understand if these tensions are reproduced online and how multimodal affordances mediate identity work. Our second question asks:

*RQ2: How do multimodal affordances used by dyslexic youth mediate identity work?*

## 3 METHODS

### 3.1 Participants

Eight young people from two different secondary schools in London (UK) took part in the research. Given our research goal to examine the relationship between dyslexia and SNS, we recruited young people who connected with the dyslexic label and volunteered to be part of the research. Participants were aged 14-16, they were native English speakers, they had a diagnosis of dyslexia or were suspected of having dyslexia, and they had experience of using SNS. Additionally, one teacher and two parents participated in the study. All of the participants gave their informed consent before the study commenced. In the case of young people, we also obtained informed consent from their parents. Table 1 summarises the main participants’ demographics.

**Table 1. Summary of participants**

Participants’ ID	Gender	Age	Diagnosis
[P:1]	Female	15	Yes
[P:2]	Male	15	Yes
[P:3]	Female	15	Yes
[P:4]	Female	14	Yes
[P:5]	Female	16	Yes
[P:6]	Male	16	Yes
[P:7]	Female	15	Yes
[P:8]	Male	15	Not yet

### 3.2 Research Approach, Procedure and Data Collection

Given the lack of previous research in this area, we adopted an exploratory research approach [52] using qualitative methods to understand dyslexic young people's practices in Facebook and Instagram [28]. Our research design does not allow us to claim a quantitative causal relationship between literacy difficulties and our study outcomes. Instead, by asking how characteristics and experiences associated with dyslexia interact with SNS we are able to generate new hypotheses about the nature of dyslexia, understand the processes that shape strategies of online communication and expression, and explore how these strategies mediate participation and inclusion.

We conducted a semi-structured interview with each participant. Each interview lasted up to one hour (M = 47mins). Six participants from school 1 were interviewed during school hours with a teacher present in the room. Two participants attending school 2 agreed to participate after school and their interview took place in their respective homes. We chose to end our data collection after the eighth interview because we reached data saturation [23] enabling us to credibly answer our research questions.

Given the exploratory approach taken in this study, the interviews were flexible and we thus adapted the questions to reflect the specific SNS practices employed by the participants involved. For example, we had initially chosen to focus on Facebook. After analyzing the modalities of expression available in a number of SNS (e.g. Instagram, Snapchat) currently used by teens [32][38], Facebook was deemed to be the "most multimodal" environment. Compared to the other SNS we reviewed, Facebook offers more modalities for expression; namely text, images, videos, emoji, GIF, external links, tag, geotag, and feelings/activities. Thus, its multimodal affordances provided the best means for examining our research questions. However, we expanded our inquiry to Instagram once it became apparent that participants used a mix of SNS, where the use of Instagram was sometimes more dominant.

During the interview, we particularly considered which SNS each participant preferred to use and why, generally minimizing the verbal intervention of the researcher and trying to create a comfortable interview setting. To avoid socially desirable responses, we did not discuss dyslexia and its impact on SNS use directly. The interviews comprised of four parts:

1. Warm up questions about the use of SNS (e.g. time spent on SNS, preferences for posting or reading others' posts) and reasons for using SNS.
2. Reflection on up to four most recent Facebook and/or Instagram posts chosen by participants from their own profiles to allow us to understand online *sharing practices*. We focused on the most recent posts to ensure participants could recall the process of composing them. The choice of platform was driven by the participants to reflect their everyday use. We asked the participants to re-construct how they composed each post, the meaning they intended to convey when sharing it and their intentions when sharing it. We went on to discuss both the different modalities of expression they used in the post and the order of modalities they used to construct it.
3. Reflection on up to 4 posts freely selected by the participant from public Facebook group pages to allow us to understand online *interpretive practices*. The group pages were either about videogames and/or art and design, both of which were chosen after consulting with the participating teacher to ensure relevance and interest with the age group involved. Participants were given a few minutes to navigate around the Facebook group page and to select a post that interested them. We asked each participant to express what motivated their choice of a post and their understanding of the post they picked. We also asked about the modalities of expression available and the order in which they were used to understand what the post expressed.
4. Debriefing questions about the aims of the study and participants' general impressions about their use of SNS.

The eight interviews were recorded and transcribed for analysis along with the Facebook and Instagram posts that formed the focus of the interviews. Specifically, we kept records of and discussed 28 Facebook or Instagram personal posts (*sharing practices*), and 20 posts chosen by the participant from public Facebook pages (*interpretive practices*).

To ensure our interpretations of the young people's interviews were plausible, we triangulated them with a teacher interview from school 1 and two parental interviews [15]. This triangulation of data served a

number of purposes. It allowed us to understand better the individual profiles of the participants along with their general difficulties, and thus provided us with background data employed to interpret some of their responses [50]. In a few cases, the teacher and parents provided the *context* of particular participant actions helping us to explain the motives underlying their choices. Our questions focused on:

- Strengths and weaknesses of each participant at school, also taking the curriculum into account;
- Family situation and its possible consequences on behaviors;
- Particular, relevant episodes or behaviors potentially connected to dyslexia and SNS use (e.g. online bullying, English as a second language).

For those participants who were interviewed at home, we followed a similar procedure and asked their parents to complete a questionnaire about their children's difficulties while doing academic work, and for some optional, additional comments on the topics mentioned above.

### 3.3 Analytic Approach

Our research is grounded in an interpretivist view, which recognizes the varied interpretations that different researchers may have of the data. According to this view, an understanding of phenomena observed is reached through personal and socially constructed experiences and meanings that guide the interpretation of the phenomena of interest [24][47].

An inductive thematic analysis was performed following a systematic coding process suggested by Braun and Clarke [13]. Our analysis initially yielded nine coding categories that we subsequently organized into themes based on our key questions related to (i) the existence and nature of the constructive practices employed by teen dyslexic users of SNS while sharing and consuming posts in SNS and (ii) the ways in which SNS affordances mediate such practices (iii) the identity dimensions. We then repeatedly reviewed the iterative analysis of the themes to ensure they expressed the full data set. In order to manage possible biases during data interpretation, the first and second authors of this paper discussed the results a few times to ensure that interpretations of the practices in light of dyslexia were not overextended or influenced by previous theoretical assumptions. At this stage of the analysis, we started considering previous research to ground our interpretations in the literature. To enhance the validity of the analysis, we triangulated data from the interviews with young people, one teacher and two parents, and the modalities used in the SNS posts collected, in order to enable us to understand better the context, the motivation and the goals behind the specific actions.

While analyzing the data, it emerged that the responses of one of the participants (P:5) did not fit within the patterns identified for the rest of the participants. During the interview, P:5 explained that she did not struggle with the primary difficulties associated with dyslexia i.e. reading or writing, but only with memory: *"I wouldn't say that my dyslexia is really... shown... through kind of this sort of stuff... like... it is not about kind of words and stuff that I read... [...] But it's more about... like... my memory"*. This participant is therefore considered as a different neurotype. Following Shenton's recommendations for developing trustworthy conclusions from qualitative research, during the analyses and discussion we used this emergent 'negative case' to compare results from the remaining seven participants [43]. Indeed, by considering the role and nature of multimodal interaction in relation to a different neurotype, we can isolate more easily the mutual influences between multimodality and dyslexia and its associated difficulties in reading and writing.

Our thematic analysis yielded nine codes that coalesced into three key themes describing how a multimodal context of SNS interacts with dyslexia:

- Theme 1: **The relationship between visual modalities and perceived characteristics of dyslexia** describes the mutual influences between the pervasive practices of sharing and "reading" images and videos, and participants' own perceptions of their literacy difficulties;
- Theme 2: **Functions and orchestration of different modalities** expresses participants' interpretations of the different communicative facilities of images and texts, with a "devaluation" of written words to a scaffold for interpreting visual modalities;
- Theme 3: **Statements of identity** captures the perception of SNS as "safe spaces" where communicating through visual modalities is socially admissible but yet involves the management of vulnerability.

## 4 FINDINGS

### 4.1 The relationships between visual modalities and perceived characteristics of dyslexia

All of the participants voiced a strong preference for using *visual* modalities (primarily videos and images) within SNS, which was confirmed by our analysis of the SNS posts collected from the participants' profiles, and of which 95% was visual. Only P:5 (who served as the negative case in our analysis) had a preference for communicating through writing. From a neurodiversity perspective [3], differences between P:5 and the remaining participants may be attributed to P:5's different cognitive and learning style characterized by neurotypical reading and writing skills, but poor memory.

In general, sharing videos and images in SNS was a pervasive practice among the participants of the study, supporting the view that new digital media promote multimodal literacies [31]. However, it can be argued that dyslexic participants strongly tailored their participation around certain modalities, avoiding orchestrated posts that included words whenever possible. Similar to how they shared their own posts in SNS, participants tended to "read" others' posts by focusing on images more so than words.

Many of our participants connected these visual forms of participation to how they perceived their literacy difficulties. For example, P:1 pointed out: *"I don't really write at all what I think [...] I mean, maybe I should write with it... it's just easier not to"*. P:3 explained: *"It's just easy for me to communicate for photos I think [...] It's just tiring of me to write I guess... And I find it kind of confusing in what I write."* P:7 described her preference for 'reading' Instagram images: *"It's easier for me because I'm not really fan of reading that much so it's kind of easier for me the way they are presented so that I can understand what is going on, so I find it easier."*

Videos, in particular, were largely perceived to be particularly appropriate when 'reading' content that was complex in nature. Participants identified videos as the most suitable means to convey the meaning of informationally dense content. Echoing our earlier findings, participants relied on their perceived difficulties to appraise the affordances of video. Three participants pointed out that videos helped them to remember new information. P:2 attributed this partly to the re-playability of videos: *"I prefer videos [...] because you can replay it... and keep replaying it... and it can stick more into your memory as a video..."* Two of the participants argued that the fluidity and transparency of information in videos was more effortless and involved less processing. In the words of P:4: *"When you have a video with voice it's easier... because they can explain what they're doing while if... if they don't you just have to try to work it out by yourself and it took it... to process it... [...] because you don't have to read it and you might not understand it... and maybe you might have to read it again."* Moreover, three participants believed video to be more engaging, not only because it circumvented text, which they found difficult, but also because of its fidelity. P:6 explained: *"Yeah I find it a lot easier for someone to talk it to me and... It's more engaging in it while if it is writing and I don't understand... like... you can never communicate if you write it fully... [...] and you get the people's true emotions..."*

### 4.2 Functions and orchestrations of different modalities

Participants interpreted each modality's communicative facility in different ways. Images were perceived to be an informationally dense modality, but also with a high potential for ambiguity. Importantly, in a context where online statements of identity may introduce vulnerability [46], images were viewed as "safe" means for self-presentation and expression. This perceived ambiguity transferred part of the responsibility for the interpretation of the intended meaning to the recipient, as a result decreasing the producer's accountability over the message and avoiding face threats. P:3 described: *"With photos you can say a lot, you can put a lot of meaning behind it, and people can interpret it how they want"*. At the same time, producers felt able to control their audience's interpretations by moderating the degree of ambiguity intrinsic to the image. As P:4 explained, when sharing a picture she can either send a clear message to her friends, or keep the meaning personal: *"You may have a meaning but anyone else can see it... that sometimes is OK and sometimes it's not"*

[...] Sometimes it's like... the meaning is personal to you and you don't want anyone to know but sometimes you want to send a message to everyone saying <Oh this is why...>”.

Moreover, our findings showed that the text modality was subjugated to a supporting role of the visual. Within the SNS posts that we observed and collected, text was sometimes present. However, it was included in the form of very short comments accompanying the visual content, either as a quote, or performing a decorative function. For example, P:2 told us that he “randomly” used text to complement his Instagram videos and he used emoji “just maybe to make it a bit nice...”. Employing a similar practice, the same participant shared a picture of himself on his SNS profile wearing an expensive “hoodie” orchestrated visually with a text caption in Chinese (see figure 1). After inviting him to reflect on this practice, the participant explained that he was not able to read Chinese and had used an online translator to translate an English sentence. Therefore, the meaning of the Chinese ideograms formed part of a cryptic message that was also aesthetically significant.



Figure 1: orchestrated post with image and aesthetic text



Figure 2: differentiating oneself through fashion

Researcher: *"Why did you write it in Chinese?"*

P:2: *"I don't know... I quite... think it went nice with it..."*

Researcher: *"And what did you want to say with that text?"*

P:2: *"I'm not really sure..."*

Similarly, within her Instagram account, P:4 posted a picture of herself in front of a mirror using a flash. Text formed the backdrop of her visual where she also wrote "Flashhhhhh" and added an emoji representing an explosion. Explaining the orchestration of her post, she pointed out how the different modalities reinforced a single intended message: *"I thought it went just well with the photo so... [...] Yeah just because it looks like an explosion or a flash or bang..."*

## 4.3 Statements of identity

### 4.3.1 The complexity of safe spaces

The freedom to use images and appropriate the use of text, strongly contributed to the perception that SNS are "safe" spaces where one can leave the dyslexia stigma behind. As P:7 explained, in SNS it is socially admissible to express oneself and communicate through visual content. One of our participants, P:6, used this safe space to engage in a self-advocacy movement. By re-sharing a video about a campaign that encouraged men to cry on his Facebook profile, his intention was to open up to his friends and bring their attention to the feelings that accompany dyslexia: *"because it's like... with my dyslexia I don't know what is related to, because I get frustrated with... what I can't say in words in an essay... or whatever I get re-anger myself [...] and so I just got oppressed [...] and I explode... and it comes out and I cry and I hate things... and I say things I shouldn't say".*

Nonetheless, this safe space was also negotiated and reproduced as a result of participants' difference in relation to their peers. Whereas text was generally avoided, participants' communicative intentions sometimes required them to write. P:1 contributed the only word-based SNS post out of the 48 posts we collected, a status about charity fund raising. On closer inspection, this participant had used an adult proxy to write her status, fearing that her spelling put her credibility and that of her cause at stake. In another example, revealed during the teacher interview, we discovered that P:8 had deactivated one of his SNS profiles after being bullied due to his frequently orthographic mistakes within the captions and comments he wrote.

### 4.3.2 Reclaiming status

Unlike the mainstream identity practices of most of our interviewees, we found that two participants used SNS to reinvent themselves, and to reclaim status and power with their peers. During the teacher interview, we learned that P:2 came from a difficult family, had suffered from depression, and had subsequently used SNS as an expressive forum to re-construct his identity. Within Instagram, P:2 had acquired more than 30,000 followers on his public profile about slimes through which he also managed to earn money. He described the videos he created and shared as *"quite cool"* and *"on theme"*, but *"without meaning"*. He attributed his popularity to his sense of what his audience wants, i.e. sensory videos of shapes and colors: *"I usually post and provide what they want, not what I want..."*. Similarly, before being bullied online, P:8 kept a public Instagram profile about videogames, where his posts were fundamentally *"videos about the kills... the funny kills... or funny kill camps... funny stuff that make people laugh"*. He attributed importance to his popularity and the status this gave him in relation to his peers: *"I got like 20k followers there... and my friends were like <Oh how did you get them, it's hard to get them>".*

Both participants had a second private profile where they shared their cultural tastes in fashion with their friends and, crucially, emphasized their material possessions. For P:2, these were trendy and expensive skating clothes. P:8 shared images of expensive rare clothes he could afford. In the interview, he described a pair of football shoes (see figure 2) that he shared on this profile and emphasized the advantage it gave him over his peers: *"I like playing football and my friends know that and they would but they can't have them. It's hard to get them because they're quite expensive... yeah... and my friends don't know where to get them, you have watch videos of Youtube to find out when they're gonna be... released... like... the shoes..."*

Therefore, both boys developed ways to express their socio-cultural identity through fashion, to strengthen their self-esteem and to re-claim status amongst known and unknown audiences. While P:2 contributed a talent that carefully catered to a wide audience and their tastes, P:1 used SNS to become the object of desire and envy of his school peers.

## 5 DISCUSSION

This paper reported on an exploratory study into dyslexic young people's use of SNS. Our research goal was to investigate how dyslexia interacts with the multimodal affordances of SNS by identifying the practices employed by dyslexic young people in environments where visual modalities of expression are socially accepted, and how these practices foster different expressions of identity.

### 5.1 Multimodal affordances and new literacies

Our findings show that young people with dyslexia exploited visual modalities in SNS and found new, creative ways to engage with text in order to shape their expression and online self-presentation. Whilst text was generally avoided by our participants, visual modalities contributed to their feelings of control over their expression and communication with others. Moreover, video was perceived to be particularly appropriate in conveying complex ideas and concepts.

Studies conducted on neurotypical young people's use of SNS show that visual practices are generally common among teenagers [19][37]. However, the same studies identify text-based social networking as a widely used approach to participation [19][37]. Among our participants, this pattern of practices was not identified. Indeed, our data reveal a strong preference toward other kinds of orchestrated multimodal compositions where text does not represent the most valuable vehicle for meaning. This finding poses a number of cross-disciplinary implications.

First, it extends Jenkins' view of multimodal design literacies [31] by suggesting that certain groups of people may have a preference toward *visual* sharing and interpretive practices. This conclusion points to the emergence of new forms of *visual literacies*. As Kress points out [32], this turn to the visual is remediating the significance of the verbal. It could lead to the "the full development of all kinds of human potentials" ([33], p.75) through a fuller expression of personal strengths. To this end, a few isolated studies that cast a cognitive lens on neurodiversity (e.g. [5][22][56]) show that young people with dyslexia may also have strengths associated with visual skills. However, given the extant literature, to date this body of work has not played a substantive role on the dominant way of thinking about dyslexia, or indeed on the way that other neurotypes are considered. Our findings lend some support to the hypothesis that dyslexia involves a *visual* cognitive and learning style by showing the widespread *sharing* and *interpretive practices* employed in SNS, although we recognize that other factors may also have contributed to the practices we uncovered. By adding to this existing literature, we believe that our study may motivate future confirmatory research in this area that identifies the specific visual possibilities that are associated with dyslexia.

Moreover, we contextualize our findings in formal education to ask whether multimodal literacies can shape how learning materials are designed and assessment strategies are planned to take account of the needs and to build on the strengths of dyslexic learners. This question intends to challenge the prevalence of and uncompromising reliance on the written form across education, whilst reflecting recent calls for a more radical transformation in formal education that allows for and legitimises multimodal forms of assessment [30][55][57]. We also ask if visual literacies could help students to develop a richer "vocabulary" for communicating ideas and for self-expression, offering educators a window onto their strengths and an opportunity for tailoring the educational support accordingly.

### 5.2 Socially constructed experiences of identity

Extreme proponents of the social model of disability advocate the view that people become disabled as a result of the environments they live in [17][21][39]. This view has been applied to dyslexia to question its existence in a pre-literate society [9]. More moderate positions accept the existence of neurological disorders but would adopt a strength-focused view of dyslexia [5][22][56]. Accordingly they would consider the

learning differences associated with dyslexia in order to design inclusive environments [42]. In line with both of these perspectives, all of our participants recognized that the *designed* environment of SNS was a “*safe*” space that did not favor a view toward normalization. Their sense of safety was the outcome of agency in carefully orchestrating their posts and their statements of identity. For example, text was used as an additional cue to reinforce the interpretation of visual modalities, or as an aesthetic element that enhanced the meaning of one’s post. Images provided the advantage to moderate ambiguity and in turn ameliorated young people’s vulnerability in how they might be ‘seen’ by their peers [27][36], revealing yet another strategy of self-presentation online that strongly reflected their tendency in visual literacy. Most importantly, participants perceived these different forms of expression and identity management to be socially accepted by their peers.

At first glance, these observations concur with Barden who argued that SNS are inclusive environments [8]. Based on our findings we posit that the difficulties experienced as a consequence of dyslexia are *different* and *weaker* in environments that privilege multimodal forms of interaction. However, as Moser has argued, disability is ordered through interactions between people, technology and other material arrangements that in turn lead to different configurations of disability [46]. Our findings provide additional insight into the nature of such ordering by showing that participants *expressed, re-created or even confronted* their differences in SNS.

To this end, most of our participants discussed their SNS practices through the lens of their perceived literacy difficulties. This allowed them to evaluate the expressive potential of different modalities, but also showed that ‘difference’ as part of one’s identity was not obviated. In contrast to a normative view that would regard difference as a negative outcome, our findings showed that participants’ evaluative judgments between environment and themselves involved complex experiences such as the use of meta-cognitive skills as to what affordances of the designed environment to use and why [22].

Beyond the expression of their existing differences in relation to dyslexia, our participants re-constituted their differences with others using SNS as an arena to reclaim status and importance. One of the participants accomplished this by calibrating his online posts to the tastes of his followers, in turn gaining others’ approval through his talent and creative strengths. While it could be argued that such identity practices are broadly relevant to teenagers, the significance of this finding is in showing how young people who are often marginalized in formal education [44][51] have similar opportunities with their peers for expressing themselves online. Empirical work by Steinfield et al. [53] has found that low levels of self-esteem – such as those often present in young people with dyslexia [14] – can translate into more social capital online. In line with this, our findings suggest avenues for future research that considers if and how self-esteem is mediated through the opportunities of SNS to re-orient identity around one’s strengths. Moreover, showcasing their new material possessions within their personal profiles, two participants strategically shifted the locus of their differences with their peers from *literacy skills to desired cultural possessions*.

While these examples show how young people sought to re-shape their difference, our findings also suggested that *difference* was at times uninvited as, unwittingly, peers or followers became critical of participants’ writing and spelling.

## CONCLUSIONS

This paper reported on an exploratory study into dyslexic young people’s use of SNS. Our goal was to understand how multimodal affordances mediated participation, and how identities manifested online. Our participants showed a strong preference and use of visual modalities in SNS that further our understanding of multimodal (visual) literacies and their role in promoting participation, while also extending existing deficit views on dyslexia to emphasize visual strengths and potential. Although we focused our exploration on Facebook and Instagram, we believe that our results also offer implications for other socio-technical contexts described by similar, multimodal affordances. Our analysis also contributes to the agenda of ‘inclusive’ and ‘universal’ design in showing that designed possibilities foster inclusive uses of SNS, but also the way in which young people can experience both opportunities and vulnerabilities is socially situated and constructed.

Combining a multimodal view on literacy with the strengths of dyslexic youth has helped us ‘reframe’ the current status quo of technology for disabled people which tends to ‘enable’ individuals to live as

competent *normal* subjects by trying to compensate the gap with so-called neurotypical individuals through a continuous reproduction of the boundaries between disabled and abled [46]. We hope that our study encourages future CSCW research to positively frame disability, and build on its longstanding research tradition on identity toward developing a more nuanced account of how online identities are experienced, socially shaped and performed by disabled people.

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