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The inclusion of students with dyslexia in higher education: a systematic review using narrative synthesis

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■ The Inclusion of Students with Dyslexia in Higher Education: A Systematic Review Using Narrative Synthesis

Marco Pino^{1*} and Luigina Mortari²

¹University of Nottingham, UK

²University of Verona, Italy

This article reports on a study focusing on the inclusion of students with dyslexia in higher education (HE). A systematic review was carried out to retrieve, critically appraise and synthesize the available evidence on how the inclusion of students with dyslexia can be fostered in HE. The 15 studies included in the final synthesis employed descriptive designs and overwhelmingly used qualitative methods to explore dyslexic students' perceptions on the impact of teaching, support and accommodation in their own learning experience. A critical appraisal of these studies revealed a landscape of significant gaps in the available stock of evidence on the inclusion of students with dyslexia in HE. The synthesis of the available evidence is presented in a narrative of five cross-study thematic areas: student coping strategies, being identified as dyslexic, interaction with academic staff, accessibility and accommodations, and using assistive technologies and information and communication technologies. Implications for practice and future research are discussed. ©2014 The Authors. *Dyslexia* published by John Wiley & Sons, Ltd.

Keywords: dyslexia; inclusion; higher education; systematic review

INTRODUCTION

Internationally, the number of students with disabilities enrolled in higher education institutions (HEIs) is on the rise, with the most commonly reported disability being specific learning difficulties (SpLDs), including dyslexia, dyscalculia and dyspraxia. In the UK, an estimated 4% of students enrolled at all higher educational levels (including undergraduate and postgraduate) had SpLDs in the 2011–2012 academic school year (Higher Education Statistics Agency [HESA], nd). In the USA, students with disabilities represented nearly an estimated 11% of all postsecondary students in 2008, of whom less than 10% had SpLDs according to the National Postsecondary Student Aid Study (although two longitudinal studies reviewed by the Government Accountability Office estimated that students with SpLDs constituted 70% of the population of disabled students in HEIs; Government Accountability Office [GAO], 2009).

*Correspondence to: Marco Pino, Sue Ryder Care Centre for the Study of Supportive, Palliative and End of Life Care, School of Health Sciences, University of Nottingham, Queens Medical Centre, Nottingham, NG7 2HA, UK. E-mail: marco.pino75@gmail.com

It can be argued that the increase of provisions and support has made it more affordable and attractive for students with disabilities to pursue postsecondary education. Internationally, legislative changes have been introduced to prevent discrimination and to provide equality of access to higher education (HE). For instance, the UK's Disability Discrimination Act of 1995 established disabled people's right to participate fully in the educational process and imposed an obligation on HEIs to provide equality of access to education through removing barriers and implementing academic adjustments and auxiliary aids and services (Kirkland, 2009). In the USA, HEIs are required to implement reasonable adjustments that would not fundamentally alter the nature of the instruction, lower academic requirements or result in undue financial or administrative burdens (GAO, 2009).

Higher Education Students with Dyslexia

HE students with dyslexia often experience problems with information processing, note-taking, essay writing and organization (British Dyslexia Association [BDA], 2013). A lack of confidence can affect their performance, especially in social situations, such as reading and writing in front of others. Dyslexic students pose a particular challenge to academic staff because their difficulties are hidden (Riddell & Weedon, 2006). The possibility of meeting the needs of students with dyslexia and enhancing their learning potential is, therefore, contingent upon their choice to self-identify as having a diagnosis of dyslexia. Frequent adjustments for HE students with dyslexia include note-takers, dictaphones, spellcheckers and extra time or support for assessments and exams.

Research is needed to determine whether these strategies can be effective in creating more equal opportunities for students with dyslexia to participate in HE. No attempts have been made, to our knowledge, to systematically review the available evidence on the impact of strategies and practices designed to foster the inclusion of students with dyslexia in HE. Through this study, we aim to fill this gap by systematically reviewing empirical research that explored the impact of adjustments and support on the inclusion of students with dyslexia in HE. After accounting for how the bibliographic search and appraisal of existing studies was carried out, the report focuses on the area that has received the most attention by the research community, that is, how students with dyslexia themselves experience participation, learning, adjustment and support in HE. Through a narrative synthesis of the literature that seeks to give voice to students with dyslexia, this review provides an updated picture on how issues of inclusion and participation in HE are perceived by students themselves, and produces recommendations for practice and future research.

METHOD

A systematic review was undertaken. This research method allows one to retrieve, critically appraise, summarize and reconcile the available evidence regarding a specific problem and to inform policy and practice (Petticrew & Roberts, 2006). A systematic review aims to comprehensively identify all relevant studies to answer a particular question and assesses the validity of each included study and taking it into account when making conclusions. The research question that

initially informed this review was as follows: *How can the inclusion of students with dyslexia be fostered in mainstream educational settings from primary schools to HE?* Another requirement for a systematic review is the transparent accounting of the procedures for the identification, selection, appraisal and analysis of the literature to be included in the final synthesis. These steps are described in the following section.

Identification of the Relevant Literature

A systematic literature search was performed in the following electronic databases: ERIC, PsycCRITIQUES, PsycInfo, Scopus, ISI Web of Science, ASSIA, International Bibliography of the Social Sciences, Proquest Dissertations & Theses, ProQuest Education Journals, ProQuest Career and Technical Education, Academic Search Premier and Medline. The search strategy was an adaptation of the strategy employed in a systematic review of the inclusion of students with special educational needs in mainstream classrooms carried out by the EPPI centre (based in the University of London and specialized in systematic reviews in the educational sector; Nind et al., 2004). Unlike that review, the search for this study was limited to students with dyslexia. Table I describes the search strategy employed in ERIC, which was adapted to fit the other databases. The search was designed to systematically retrieve English-language studies focusing on the inclusion of students identified as dyslexic in mainstream educational institutions, ranging from primary to HE educational levels, and published between 1994 (when the Salamanca agreement (UNESCO, 1994) marked the global commitment to inclusion) and October 2013. No methodological delimiters (e.g., only outcome evaluations) were employed. Attempts were also made to retrieve unpublished reports (so called 'grey literature', including theses and dissertations, internal reports and conference communications, whenever available). Relevant websites and journals were also manually searched, as were the reference lists from the retrieved studies (so called chaining technique). Furthermore, e-mails were sent to several researchers and organizations that were active in the area of dyslexia. All citations were saved using a reference management software to remove duplicates and to keep record of the selection process.

Selection of Studies

Studies were included that met the following inclusion criteria: (1) were conducted in mainstream educational settings; (2) focused on students identified as dyslexic; (3) contained indications of the impact of interventions, supports and services on students; (4) were concerned with educational levels ranging from primary school to HE; (5) involved empirical studies such as descriptions,

Table I. Search strategy

<p>Primary search in ERIC (1994–October 2013, English language)</p> <p>YR(1994 OR 1995 OR 1996 OR 1997 OR 1998 OR 1999 OR 2000 OR 2001 OR 2002 OR 2003 OR 2004 OR 2005 OR 2006 OR 2007 OR 2008 OR 2009 OR 2010 OR 2011 OR 2012 OR 2013) AND SU(dyslex*) AND SU(inclusion OR inclusive education OR inclusive schools OR mainstream* OR regular and special education relationship OR universal design for learning) NOT LV(Early Childhood Education AND Preschool Education)</p>

explorations of relationships, evaluations and systematic reviews; and (6) were published or produced between 1994 and October 2013.

The primary studies identified were inconsistent in defining dyslexia and inclusion, reflecting a general lack of consensus regarding the meaning of these terms (Norwich, 2009). Some authors conceptualized dyslexia as a “disorder in which a persistent problem arises with acquiring and applying reading and/or spelling at word level” (Diraä, Engelen, Ghesquière, & Neyens, 2009, p. 457), while others viewed it as a form of neurodiversity, that is, “as a normal human difference that should be tolerated and respected in the same way as other human differences” (Griffin & Pollak, 2009, p. 25). The ERIC Thesaurus defines dyslexia as “impairment in the ability to read despite adequate intelligence and proper instruction” (Education Resources Information Center [ERIC], nd). This systematic review includes studies focusing on students who were identified as dyslexic (BDA, 2013). As for the term ‘inclusion’, the ERIC Thesaurus defines it as “successfully educating all students (whether with or without disabilities, disadvantages, etc.) together in the same schools and classrooms, while celebrating the resulting diversity, including various abilities and cultures” (ERIC, nd). In line with this definition, this systematic review includes studies that addressed interventions, services and other forms of support that were designed to enable dyslexic students’ access to the mainstream curriculum and to help improve their learning experience therein.

Figure 1 displays the screening process using a PRISMA flowchart (Moher et al., 2009). The studies retrieved through the primary search strategy (electronic databases) underwent a two-stage process. First, they were screened based on inspection of titles and abstracts. Next, the included studies went through a second-stage screening that consisted of full-text inspection. Ultimately, the overall screening process identified 50 studies that met our criteria. Of these, 15 focused on HEIs and are examined exclusively in this report.

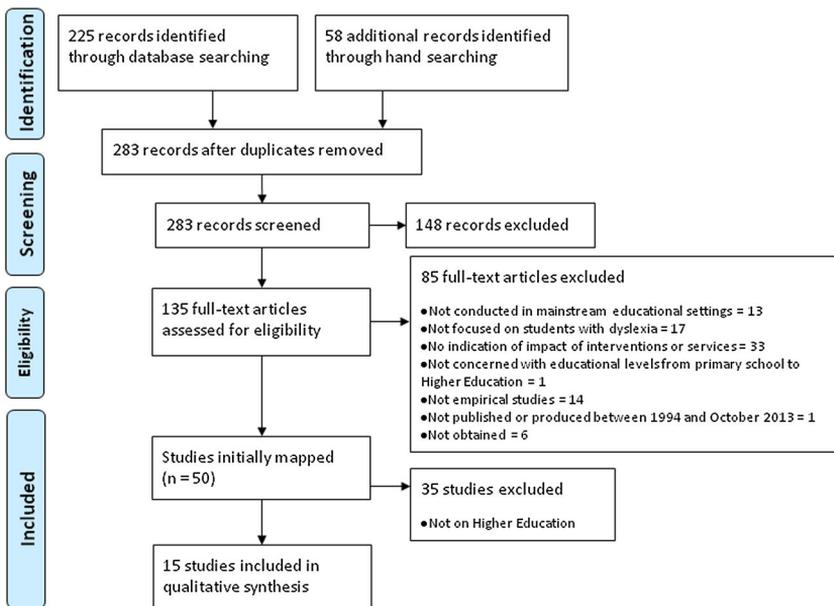


Figure 1. PRISMA flowchart.

A decision was made to retain studies focusing on students enrolled in access courses in preparation for taking a degree course because these studies also involved dyslexic students who were engaging in postsecondary education and were of the same age group as the participants in the other studies. Furthermore, many themes described in these studies resonate with the ones emerging from the studies carried out in the HEIs. Finally, we also decided to include studies that focused on students with different types of disabilities, extracting relevant data for our review, provided that it was possible to discriminate study findings that specifically referred to students with dyslexia.

Critical Appraisal and Data Extraction

A systematic review should not blindly incorporate all the available evidence regardless of the trustworthiness of the primary studies. We therefore performed a critical appraisal by adapting procedures devised by the EPPI centre (Nind et al., 2004; Oliver & Peersman, 2001). The selection process returned 15 studies that incorporated descriptive designs, whose main area of thematic overlap was dyslexic students' own perceptions on learning, participation, adjustment and support in HE. Hence, for the in-depth phase of the review (including critical appraisal, extraction, analysis and synthesis of evidence from the primary studies), we narrowed our focus to the following question: *How do students with dyslexia experience the impact of teaching, adjustment and support in HE?*

Because the 15 studies that remained after screening overwhelmingly used qualitative research methods, we also followed the indications of the Cochrane Collaboration Qualitative and Implementation Methods Group (Hannes, 2011) and the Centre for Evidence-Based Management (CEBMA, nd) to ascertain the quality of the studies along four dimensions (Lincoln & Guba, 1985): credibility (findings fit the perceptions of the participants), transferability (findings can be useful to illuminate other settings), dependability (the research process is traceable and clearly documented) and confirmability (the effect of the researcher(s) is accounted for). Such dimensions bear on the soundness or trustworthiness of the studies, that is, on their ability to answer their own research questions. Our appraisal tool (reproduced in the APPENDIX) comprises 10 yes–no questions divided into two domains: internal methodological coherence and relevance of the study focus for the review questions. For the assessment of internal methodological coherence, we asked whether each study focused on a clearly defined question, the appropriateness of the research method, sample design and analysis procedures for answering such question, and whether participants and setting were clearly described. We also checked the reliability of the analysis procedure and the traceability of the research process. For the assessment of relevance, we asked whether each study dealt with aspects that were relevant to the inclusion of dyslexic students in HE (e.g., teaching approaches, assessment approaches, support services, identification/diagnosis of dyslexia in HEIs, use of assistive technologies [ATs] and information and communication technologies [ICTs], peer support, and relationship and communication with academic staff) and whether each study provided extensive and detailed representations of the students' views on these matters. The overall weight of evidence assigned resulted from synthesizing these separate judgments (internal soundness and relevance to the review question) and rating each study along a 5-points scale: low, medium-low, medium,

medium-high and high weight of evidence (see the appraisal tool in the APPENDIX). We decided to include in the final synthesis all the studies that had scored above low. The rationale behind this inclusive approach was that the goal of this review was to provide an initial overview of the existing knowledge state regarding the inclusion of people with dyslexia within HE, a relatively new and unexplored domain, and to stimulate further research on the topic. Nevertheless, not all of the results reported in the primary studies were included in the final synthesis. The differences in weight of evidence among the primary studies were also taken into account in the synthesis stage so that studies with a high or medium-high weight of evidence influenced the review results and conclusions more than the other studies. In addition to these inter-study comparisons, an intra-study comparison was undertaken to discriminate data that, in each primary study, could be considered as having primary weight for this review. For instance, a primary study could report findings (e.g., how students with dyslexia experience assessment in HE) that were strongly supported through extensive quotes while also containing findings that were less convincingly demonstrated. As a result, all findings evaluated as having primary weight of evidence were given priority in the review synthesis. Findings that gained a secondary weight of evidence were considered as indicative but not determinant in the formation of the synthesis.

Two options are generally available for data extraction (Noyes & Lewin, 2011a): selective and inclusive. Because the question raised in this review is relatively new and unexplored and to avoid missing potentially valuable evidence to the review question, we adopted an inclusive approach to data extraction. All text contained in the results sections of the primary studies (including data and author interpretations) that was relevant to the review question was thus copied to an extraction sheet.

Analysis and Synthesis of Evidence

The text extracted from the primary studies constituted the data for the in-depth review and was analysed using thematic analysis (Braun & Clarke, 2006; Noyes & Lewin, 2011b) to identify recurring themes. The analyses were conducted using the following steps: (i) repeated reading; (ii) identification of relevant units of meaning (conceived as discrete portions of text where a participant's view is conveyed regarding a single matter relevant to the review question; Braun & Clarke, 2006); (iii) labelling of each unit using a descriptive code; (iv) grouping of the codes into themes; and (v) grouping of the themes into thematic areas. The analysis was inductive and iterative by repeatedly returning to the data to check the ability of the emergent themes to fit the students' perceptions as displayed in the primary studies. Finally, emergent themes that were only supported by secondary weights of evidence were dropped from the final synthesis. The remaining themes are supported by data having primary weights of evidence. The thematic areas are displayed in Figure 2, which also shows the set of primary studies supporting each thematic area.

Two main approaches are available for synthesizing such evidence as ours (Barnett-Page & Thomas, 2009; Dixon-Woods et al., 2004; Noyes & Lewin, 2011b; Parry & Land, 2013): integrative (sometimes called aggregative) and interpretive (also known as theory building). We employed an integrative approach by identifying recurrent themes across the primary studies and summarizing them under thematic headings. Our primary goal was not to engage in secondary data

Thematic areas	
Student coping strategies	# 2, 6, 7, 8, 11, 13, 15, 16
Being identified as dyslexic	# 7, 8, 12, 13, 14, 15
Interaction with academic staff	# 3, 6, 8, 9, 10, 11, 12, 13, 14, 15
Accessibility and adjustments in HE	# 2, 3, 4, 6, 7, 8, 9, 12, 13, 14, 15, 16
Using ATs and ICTs	# 4, 5, 6, 7, 11, 12, 13, 15

Figure 2. Thematic areas. ATs, assistive technologies; ICTs, information and communication technologies; HE, higher education.

analysis and independent theory generation, but to bring together the available evidence on how dyslexic students experience the impact of teaching, adjustment and support in HE. This required a certain amount of cross-study translation in order to reconcile themes that took different names in different studies. Nevertheless, we did not identify themes that had not been already identified in the primary studies. The methodological homogeneity among the primary studies, which were overwhelmingly interview-based qualitative studies, facilitated this endeavour. Consistent with the integrative approach to synthesizing evidence is the use of thematic analysis for analysing the extracted data and of narrative synthesis for reporting findings (Dixon-Woods et al., 2004). Narrative synthesis involved descriptively summarizing the identified themes under thematic headings.

RESULTS

Our bibliographic search identified 15 relevant studies. The results of the critical appraisal are displayed in Table 2, which also includes an overview of each study (in what follows, we refer to the primary studies through the study label numbers in Table 2; notice that study N.13 was reported in two separate publications).

Six studies (3; 9; 12; 13; 14; 15) were considered to have a low level of internal methodological coherence because the data collection or the analysis procedures were not clearly traceable. Six studies were granted a medium level of internal methodological coherence because the authors' interpretations were not always supported through participants' quotes (1; 2; 7; 8) or the study failed to provide detailed information on the students' perceptions of an intervention (4) or some of the analytic procedures were not described (6). Three studies (5; 10; 11) presented a high level of methodological coherence due to the transparency and solidity of their research designs, and their ability to provide in-depth characterization of the students' views. With regards relevance for the review question, one study (4) presented low relevance because only one dyslexic student had been informally interviewed. Four studies had medium relevance because they did not always discriminate between the views of dyslexic students and those of other participants (2; 7), or the findings were primarily based on the perspectives of other types of participant and only secondarily on those of dyslexic students (8), or the study design allowed only limited exploration of the students' experiences (6). The remaining studies (1; 3; 5; 9; 10; 11; 12; 13; 14; 15) were highly relevant for the review question.

Table 2. Description of studies (N = 15)

Study #	Author(s)	Year/ country	Methodology	Sample	Method of data gathering	Method of data analysis	Weight of evidence (WoE) and main elements bearing on critical appraisal	Main results
1	Carter & Sellman	2013/UK	Constructivist Grounded Theory	11 students (4 with dyslexia)	Semi-structured interviews	Coding and categorizing using NVivo	Internal soundness: medium (interpretations not always supported through quotes). Relevance for the review question: high. WoE: medium-high	Concordance between one's own way of working and contextual expectations is important to account for differences between students' experiences of writing. In the view of students, competent instructors provide individualized instruction, build rapport, demonstrate knowledge about LDs, are alert to alternatives to assist student learning, and are accessible outside the classroom.
2	Cornett-DeVito	2005/USA	Phenomenology	21 students with learning difficulties (LDs) (number of students with dyslexia unspecified; the results section reports the views of 3 students with dyslexia)	In-depth interviews	Description, reduction and interpretation (iterative process). Meaningfulness of themes confirmed through a focus group	Internal soundness: medium (interpretations not always supported through quotes). Relevance for the review question: medium (it is unspecified how many participants were dyslexic). WoE: medium	Difficulties in assistive technology (AT) use were related to software configuration and disclosure of dyslexia. Students' use of AT was limited to low order functions.
3	Diraä, Engelen, Ghesquière & Neyens	2009/ Belgium	Survey	32 students with dyslexia	Semi-structured interviews	Unspecified	Internal soundness: low (data analysis not described; aspects of intervention delivery left unspecified). Relevance for the review question: high. WoE: medium	Difficulties in assistive technology (AT) use were related to software configuration and disclosure of dyslexia. Students' use of AT was limited to low order functions.

(Continues)

Table 2. (Continued)

Study #	Author(s)	Year/ country	Methodology	Sample	Method of data gathering	Method of data analysis	Weight of evidence (WoE) and main elements bearing on critical appraisal	Main results
4	Dixon	2004/UK	Mixed methods	25 students (2 disclosed dyslexia)	Questionnaire, participant observation, video recording of students using the software and informal interviews	Descriptive statistics; qualitative data analysis of video recordings	Internal soundness: medium (no details on how the software improved students' understandings). Relevance for the review question: low (only one dyslexic student informally interviewed). WoE: medium-low	The animation software tool moderately increased the students' learning. The dyslexic students valued the following components: explicit visual model, one-to-one support, repetition and formative feedback. The students enrolled in an online course using Second Life reported both technical difficulties and benefits (including learning through concise and multiple-format materials). The study describes students' difficulties, coping strategies and views of support in HE.
5	Dziomy	2012/USA	Mixed methods	Online survey: 92 students	Online survey, observations and two semi- structured interviews	Descriptive statistics; Grounded Theory	Internal soundness: high (interpretations grounded in quotes; traceable research process). Relevance for the review question: high. WoE: high	The study describes the experience of being identified as dyslexic.
6	Farmer, Riddick & Sterling	2002/UK	Survey	74 students with dyslexia	Questionnaire	Descriptive statistics; procedure for qualitative analysis unspecified	Internal soundness: medium (procedures of qualitative analysis left unspecified). Relevance for the review question: medium (the	

7	Griffin & Pollak	2009/UK	Unspecified (qualitative)	27 students with LDs (13 with dyslexia)	Semi-structured interview	Thematic analysis using both NVivo 7 and a traditional paper-based approach; constant reviewing of emergent themes	study design provides only limited access to students' views). WoE: medium	Internal soundness: medium (interpretations not always supported through quotes). Relevance for the review question: medium (responses from students with different LDs are not always differentiated). WoE: medium	The study describes the emotional and identity implications of being formally identified as neurologically diverse individuals. Students reported difficulties with lecturers and accessibility issues with HE courses.
8	Hadjidakou & Hartas	2008/ Cyprus	Unspecified (qualitative)	10 students with disabilities (2 with dyslexia), 4 tutors and 10 Heads	Semi-structured interviews and focus groups	Thematic analysis	Internal soundness: medium (interpretations not always supported through quotes). Relevance for the review question: medium (findings primarily based on tutors' views and only secondarily on students' views). WoE: medium	Internal soundness: medium (interpretations not always supported through quotes). Relevance for the review question: medium (findings primarily based on tutors' views and only secondarily on students' views). WoE: medium	Students described lecturers' lack of awareness of dyslexia.
9	Hanafin, Shevlin, Kenny & Mc Neela	2007/ Ireland	Unspecified (qualitative)	16 students (7 with dyslexia)	Semi-structured interview	Textual readings of transcripts and identification of categories	Internal soundness: low (research process not clearly traceable and only limited space granted to students' views through quotes). WoE: medium	Internal soundness: low (research process not clearly traceable and only limited space granted to students' views through quotes). WoE: medium	Students described accessibility issues and lecturers' lack of awareness of dyslexia.

(Continues)

Table 2. (Continued)

Study #	Author(s)	Year/ country	Methodology	Sample	Method of data gathering	Method of data analysis	Weight of evidence (WoE) and main elements bearing on critical appraisal	Main results
10	Hughes, Herrington, McDonald & Rhodes	2011/UK	Ethnography	2 students with dyslexia and 1 tutor	Interviews	Construction of a retrospective narrative; collaborative analysis in which the participants are co- researchers; reflexivity	Relevance for the review question: high. WoE: medium Internal soundness: high (interpretations grounded in quotes; coherent and highly traceable research process). Relevance for the review question: high. WoE: high	The e-portfolio tool (based on the system PebblePad) enabled the students to gain control of the medium and, hence, of their own learning process.
11	Palfreman- Kay	2000/UK	Grounded theory	8 students with dyslexia	Semi-structured interviews	In vivo coding, identification of themes, reflexivity	Internal soundness: high (interpretations grounded in quotes; coherent and highly traceable research process). Relevance for the review question: high. WoE: high	The findings cover students' views of peer support, professional support, ATs and identification as dyslexic.
12	Pollak	2005/UK	Unspecified (qualitative)	33 students with dyslexia	Interviews	Coding of transcripts using NUD.IST; member checks	Internal soundness: low (research process not clearly traceable; interpretations not clearly grounded in quotes). Relevance for the review question: high. WoE: medium	The study describes how the students came to terms with a formal diagnosis of dyslexia.

13	13a) Riddell, Tinklin & Wilson 13b) Riddell & Weedon	2005/UK 2006/UK	Case study	48 students with dyslexia	In-depth interviews	Unspecified	Internal soundness: low (data collection and analysis procedures not traceable). Relevance for the review question: high. WoE: medium	The study describes (1) students' experiences with being identified as dyslexic and (2) their views on the meaning of disability and access to reasonable adjustment in assessment.
14	Riddick, Farmer & Sterling	1997/UK	Unspecified	16 students with dyslexia	Interviews	Unspecified	Internal soundness: low (no data analysis is provided by the authors). Relevance for the review question: high. WoE: medium	The study presents students' narratives about being identified as dyslexic, coming to terms with the label of dyslexic, attitudes of relevant others and institutional support.
15	Taylor & Palfreman-Kay	2000/UK	Critical ethnography and Grounded Theory	10 students with dyslexia and 4 deaf students	Semi-structured interviews	Grounded theory	Internal soundness: low (data collection and analysis not clearly traceable). Relevance for the review question: high. WoE: medium	Students with dyslexia received more support by non-disabled peers than deaf students did.

Three studies (5; 10; 11) earned an overall high weight of evidence (having scored high both in internal methodological coherence and relevance for the review question). The remaining studies scored between medium-high and medium-low. Because no study scored low, we included all the studies in the final synthesis.

Overall, the critical appraisal and mapping of the relevant literature yielded a picture characterized by a limited amount of high-quality evidence (we will discuss some of the gaps in the available evidence throughout the analysis). Nevertheless, our inclusive approach to data extraction (see Critical Appraisal and Data Extraction section) allowed the retrieval and synthesis of a significant amount of evidence, with considerable areas of thematic convergence across the studies. These thematic areas include student coping strategies (8 studies), being identified as dyslexic (6 studies), interaction with academic staff (10 studies), accessibility and adjustments (12 studies), and using ATs and ICTs (8 studies) (Figure 2). In what follows, we present the thematic areas in a narrative synthesis of how students experienced the impact of teaching, adjustments and support throughout their learning journey in HE. We use quotes from the primary studies to exemplify some of the themes.

Student Coping Strategies

Eight studies (1; 5; 6; 7; 10; 12; 14; 15) dealt with how students with dyslexia overcome or compensate for difficulties in the HE environment; four themes were identified: study skills; compensatory strategies; help from family, friends and fellow students; and meta-cognitive and meta-affective skills.

Study skills that the students employed included strategies to deal with written texts, such as reading slowly and out loud (5), identifying key points (1), and underlining or copying sentences from books (14). Some students positively valued the opportunity to access materials in multiple formats (visual and oral; 5) and to study using visual techniques (concept maps and colour coding, which are helpful for memory; 7; 10; 12) and oral techniques (talking about study contents with others rather than writing down notes; 14). One study (1) described how some students navigated writing requirements both by adapting their style to meet academic standards and by negotiating the potential modification of some of those standards; for them, using a clear and straightforward writing style was helpful, and they reported that sometimes the use of informal expressions was accepted ('Student F confidently uses informal expressions (don't, it's, and dodgy ground), explaining that not only does this "suit him", but that it is acceptable in his department, where explaining complex ideas independently and simply is valued'; 1, p. 160).

Compensatory strategies were used by students in the context of lectures and include receiving copies of notes and transparencies from professors (5), downloading and printing PowerPoint presentations before lectures (writing notes on the printed copies spared the students from moving their gaze back and forth between the screen and the notebook; 5) and tape-recording lectures (5; 6; 7).

Many students relied on *help from family members, friends and fellow students* in several aspects of their work, such as writing (revising and editing drafts; having someone type for the student; 5), and obtaining or integrating notes (borrowing lecture notes from other students; 5; 14; 15).

Many students described *meta-cognitive and meta-affective skills*. Meta-cognitive skills include self-organization strategies such as time planning (6; 7) and using

essay-plan diagrams (12). Some students selected the most productive times and places to study to maximize one's own ability to learn (1; 12). The latter set of strategies also has meta-affective relevance, insofar as it helped to reduce distractions and create a 'comfort zone' (Carter & Sellman, 2013) in which feelings of competence are generated. These strategies reveal students' knowledge of their own abilities, weaknesses and preferred learning styles. Additionally, they signal students' understanding of their own emotional responses and their ability to manufacture environments that minimize negative effects. Some students displayed awareness of the fact that their level of interest in the subject matter at hand could significantly influence their opportunities to succeed (5); that is, enthusiasm could compensate for earlier negative school experiences, which could otherwise prevent dyslexic students from productively interacting with the learning environment (1). Another learning strategy to which several students recurred was repetition (e.g., interacting with materials at length) (5; 12).

Being Identified as Dyslexic

Six of the reviewed studies (6; 7; 11; 12; 13; 14) focused on the students' experiences of being identified as dyslexic while being enrolled in HE. Several students reported that assessment procedures could cause stress and anxiety (e.g., about performance; 6; 11; 12). The first diagnosis of dyslexia could produce an initial shock or disorientation (6; 11; 12), making it hard to accept ('I felt quite down about it and I actually took my time in accepting that I was dyslexic', 11, p. 211). Coming to terms with the label of 'dyslexic' can be difficult, and some students reported that they did not regret not having been diagnosed earlier (e.g., 'I'm quite pleased I hadn't known until I was 15, because if I'd known earlier it might have been an excuse, or there would have been a reason for not doing your GCSEs', 14, p. 134; 13). While some students described themselves as disabled, others came to terms with the 'dyslexic' label by considering themselves as having 'difficulties'; for them, this definition was more compatible with the self-image of competent individuals ('[I] don't see myself as disabled. I ask myself the question, "Has it stopped me from doing anything?" and the answer is "No"', 13a, p. 137).

For the majority of students surveyed, though, the diagnosis ultimately had a positive impact. First, this diagnosis brought a sense of relief because the assessment confirmed that one was not simply 'stupid'—a perception often acquired through early school experiences ('At least I know it's not me being stupid, me being disorganised', 14, p. 97; also 6; 7; 11; 12; 13). The diagnosis, then, provided an explanation for the difficulties encountered by the students (14). Secondly, and related to this, the diagnosis opened the door to the possibility of building a more realistic view of one's own strengths and weaknesses (11), with the possible effect of bolstering self-esteem (13), increasing confidence (14) and fostering encouragement to carry on with one's own studies (14).

Interaction with Academic Staff

Ten studies dealt with students' experiences with academic staff (2; 5; 7; 8; 9; 10; 11; 12; 13; 14). The most critical aspect raised by the students was the lack of

awareness of dyslexia on the part of some lecturers and tutors (13; 14). Some teachers in HE were unresponsive when students communicated their dyslexia ('Some tutors have been really good and asked me to tell them that I'm dyslexic as they really need to know and others have sort of said, "Oh well so what, what do you want me to do about it?"', 13b, p. 67). Some even displayed misconceptions or prejudice towards dyslexic people, for example by confusing dyslexia with mental retardation (8), mistaking it for laziness (13), considering it as an 'excuse' to obtain concessions (13; 14), or viewing dyslexic students as unable to succeed academically ('When I, I went to see a lecturer about my essay he told me that there was no point aiming for any higher because you're dyslexic', 7, p. 34; 9; 11) or in specific professions such as medicine (13). Some teachers expressed scepticism about the very existence of dyslexia (7). Some consequences of these teachers' attitudes were that students had to struggle to obtain teachers' attention and insist on obtaining modifications (9; 13; 14). In addition, some teachers failed to take dyslexia into consideration when grading students' work (e.g., some students received lower marks for bad spelling; 14). Some academic staff members were also reported to have expressed concerns about equality (13; 14). For instance, some teachers withheld the provision of lecture notes in electronic format, claiming that this would give unfair advantage to the students with dyslexia over other students (2; 3). Conversely, the students appreciated teachers who demonstrated knowledge and awareness of dyslexia (2; 7; 8; 9; 11; 12). Responsiveness and readiness to provide resources and adjustments (10; 11; 12; 14), availability (2; 7) and willingness to answer questions (5) were positively valued qualities. In some specific settings (such as the blended course described in 10), rapport was seen as an integral part of the learning process (see also 7; 11). Valued tutor qualities included empathy (10; 12), sympathy (2; 13), trustworthiness (11) and open-mindedness (10; 11). Congruence between tutor values and student values was also important (10).

Teaching approaches

Students valued teaching approaches that took into account learners' differences. A student contrasted this approach to one in which students are 'told do this, get on with it' (10, p. 59). In two studies (5; 12), students made positive comments about interactive teaching styles, in which their contribution in discussing course content was welcomed. These students described themselves as willing to engage actively in the learning process and to interact with course materials and other students when given the opportunity to do so (5). Practice and hands-on experience were also valued significantly compared with more traditional pedagogical formats (e.g., straight lectures). A student-centred style was described in one study (10); this was regarded as a non-judgemental, appreciative style that acknowledged students' background knowledge and gave them responsibility. This outlook is compatible with overcoming the deficit model of dyslexia and adopting a more nuanced, multi-layered view of this condition, taking into account not merely students' weaknesses but also their strengths (e.g., creative and critical thinking). A student-centred approach was also regarded as empowering, insofar as it enabled the students to speak in their own voice and to use their own language. Graphic-rich presentation styles, formative feedback and making the lecture structure explicit at the outset were also regarded as useful (12).

Universal design for learning

It has been argued that many obstacles to the inclusion of dyslexic students can be prevented by adopting a universal design for learning (UDL; Dziorny, 2012); that is, designing education to simultaneously accommodate students with diverse learning needs, including students with disabilities and SpLDs. In this framework, instruction is designed with an orientation towards the diversity among student needs. This reverses the traditional instructional approach in which adjustments for diverse students must be negotiated on an individual basis. In UDL, an orientation to the needs of all students is incorporated in the instructional design from the outset. This review identified three studies (4; 5; 10) that explored students' experiences of instructional interventions that were designed to simultaneously accommodate the needs of students with and without SpLDs. All interventions used ICTs. For instance, Dixon (2004) showed that a Code-Memory Diagram Animation Software Tool enhanced students' self-reported understanding in a computer programming module. According to Dixon, the software helped foster learning for all students but dyslexic students especially. However, the critical appraisal raised concerns about the ability of this study to describe in detail *how* the software improved students' understandings. The study thus had limited relevance in the context of the present review, whose goal was to elucidate students' own understandings of what enhances their instructional experience. Another limitation of Dixon (2004) is that only one dyslexic student was informally interviewed in this study. Hughes, Herrington, McDonald, and Rhodes (2011) studied the implementation of an e-portfolio-based course delivered to students with and without dyslexia. After describing how, in the view of two students with dyslexia, the e-portfolio enabled the personalization of their learning processes, the authors suggested that the course was also beneficial to students without dyslexia; however, this finding was derived indirectly from the reports of the two learners with dyslexia who took part in the study. Finally, Dziorny (2012) studied the impact of an online instructional design using Second Life on the learning experience of students with and without dyslexia. Nevertheless, when drawing conclusions from the data, Dziorny focused exclusively on whether the course met the needs of the students with dyslexia. These studies show how it is possible to design inclusive courses to meet the learning needs of students with and without dyslexia. More research is needed, however, to compare how dyslexic and non-dyslexic students experience working together and utilizing the same learning tools and materials.

Written exams

Written exams as described in the reviewed studies were associated with several difficulties, such as having insufficient time (12; 13; 14) and lacking adequate prompts to help recollect relevant information (14). Moreover, emotional tension and stress could be associated with declining performance in spelling and grammar (12) and with forgetting otherwise known information (14). Some students felt discriminated by the use of written examinations as the dominant assessment modality because their writing performance did not reflect their actual level of knowledge and mastery of the subject matters (12; 13). Extra test-taking time was hardly sufficient to compensate for this state of affairs, which can be overcome by introducing alternative assessment modalities ('Rather than extra time in exams, Maurice considered that an alternative form of assessment based on oral work should be permitted', 13a, p. 135).

Lectures

As for *lectures*, many students found it useful to receive printed handouts (with appropriate font type and size) (7; 12), to download electronic presentations and notes and to read them in advance (3; 7). These resources can help compensate for the difficulties associated with having to coordinate note-taking and listening to teachers in real time, especially when they talk fast. Some students lamented excessive reading requirements in the context of online courses (5).

Accessibility and Adjustments

Twelve studies dealt with issues of accessibility and adjustments (1; 2; 3; 5; 6; 7; 8; 11; 12; 13; 14; 15). Modifications of examination protocol included additional time, note-takers, use of laptops, providing alternative testing environments, and expanding or substituting written with oral examination. While assessing students' work, teachers could take into consideration their dyslexia and, hence, make allowances for incorrect spelling and grammar. In addition, extended deadlines were often provided to complete course assignments, such as essay writing. Useful adjustments to lectures included the following: allowing the recording of lectures, adjusting the speed of information presentation and providing note-takers.

Riddell and Weedon (2006) observed that the students they interviewed had limited awareness of their right to request alternatives to written examinations and coursework. Students from two studies expressed the view that it was not possible for lecturers to modify their teaching to fit individual needs (12; 14). To the contrary, other students expressed the expectation of receiving adjustments to fit their individual needs (12). Yet, students did not recur to adjustments in all their classes (5), sometimes to see whether they could carry on without external help ('I didn't use my accommodations because I wanted to see how I would do without them this semester', 5, p. 145). Access to adjustments was contingent on the students' willingness to disclose their diagnosis of dyslexia, which could be costly in psychological terms. Some students expressed ambivalence regarding this matter (13b). In particular, although they did not want to draw attention to their condition, at the very least they wanted to avoid difficult situations ('You come in, you're like, "Oh God please don't give me anything to read or write you know, to read out in front of anybody"', 13b, pp. 67–68) or to access support and adjustments. Some students were reportedly reluctant to self-disclose as dyslexic for fear of discrimination ('I am wary of disclosing my disability because I am concerned how I would be labelled', 11, p. 248). Others regarded such disclosure as strategic to access support. Finally, some students preferred to be open about their dyslexia and to inform others at the first available opportunity.

Using Assistive Technologies and Information and Communication Technologies

Eight studies (3; 4; 5; 6; 10; 11; 12; 14) addressed the use of ATs and ICTs. Regarding ATs, several students found the computer to be useful, insofar as word processing grants greater control over the medium. In addition, while the spell-checker spots mistakes, it can also present limitations (e.g., 'The spellchecker displays a list of possible words, and I still don't know which one is correct', 14, p. 96). Some students found voice-recognition software useful (1; 11; 12), and mixed opinions were observed about tape-recording lectures. For some, this was a useful strategy in compensating for the difficulty of listening to a lecturer's

voice while simultaneously taking notes (12). For other students, tape-recording lectures was not a viable solution (e.g., because they did not have time to listen to the tapes afterwards; 5).

The main reported advantage of ICTs was that they enhanced student control over the learning process. For instance, ICTs enabled the students to highlight text, to maintain position while reading (3; 4), to engage in mind-mapping (10) and, more broadly, to employ visual models or working styles (3; 4; 10). ICTs were also useful in retrieving information (3; 4; 10) and helping with auditory memory (10). Electronic learning environments—such as the ones used in online courses (5; 10)—helped to slow down the flow of information presentation, making the learning process more predictable and enabling repetition. Reading on screen (which allows one to adjust font type, size and colour) increased reading speed.

Self-pacing is an ingredient of student control, with the students being able to proceed at their own speed as compared, for instance, with straight lectures ('I could go slow if I didn't understand something and repeat it over and over until I got or I could go quickly if I did get it'; 5, p. 135). Therefore, the material can be accessed repeatedly at one's own pace. The students found online courses to be more accessible when the volume of information (3; 4; 10) was reduced and concise materials were offered (5). Additionally, the students saw summaries of contents as useful (5). The opportunity to enhance student control over the learning process could boost confidence and have a positive impact on self-image including a more balanced understanding of one's own strengths and a sense of self-efficacy ('I feel the Pebble-pad has aloud (allowed) me to be at the same level as everyone else and in some cases ahead of them. I'm sure you can imagine what this does to my confidence and self-esteem', 10, p. 54).

DISCUSSION

A systematic review was performed to retrieve and synthesize the available evidence on how the inclusion of students with dyslexia can be fostered in mainstream educational institutions. After initially mapping the available literature and through progressive refinement of the initial question, the in-depth stage of the review focused on the following research question: *How do students with dyslexia experience the impact of teaching, adjustment and support in HE?*

In the thematic area of *being identified as dyslexic*, the findings suggest that although students can react negatively when originally informed of their dyslexia diagnosis, the diagnosis brings awareness of one's own condition and thus an opportunity to improve the learning experience. While previous school experiences may have produced the feeling of being 'stupid', the diagnosis provides an explanation for the difficulties with literacy. As Norwich (2009) stated, 'this positive self-conception arises from a key aspect of the historic meaning of dyslexia, which excludes low intellectual abilities as a cause of the literacy difficulties' (p. 186). In time, students can acquire a more balanced view of their strengths and weaknesses and develop cognitive and affective strategies that enhance their learning experience. The diagnosis can also have a motivational effect by encouraging the students to pursue HE.

In the area of *interactions with academic staff*, the students positively evaluated teaching approaches that went beyond traditional formats (such as straight

lecturing). They favoured teaching styles that allowed them to employ the full range of their communication and expression abilities to exhibit their knowledge and competence. This became possible in learning environments that provided ample opportunities to access study materials in multiple formats and to autonomously regulate the speed of information processing. The possibility of gaining control of the medium was, hence, a key component of successful learning experiences and was enhanced by the use of ICTs. The students also favoured interactive and student-centred teaching approaches.

In the area of *accessibility and adjustments*, individualized adaptation and lenience helped the students to navigate HE, especially in the assessment domain. Some students felt that standard adjustments (such as the use of a laptop and extended time) were sufficient. Others felt discriminated against by the dominance of written assessment because it does not enable them to fully express their actual level of knowledge and competence (13). As Hanafin, Shevlin, Kenny, and Mc Neela (2007) stated, 'the over-reliance on written techniques of assessment can exclude many learners from successful assessment experiences as can the practice of requiring learners to communicate all they know about a topic within a limited and rigidly imposed time frame' (p. 438).

Students can be unaware of their right to require adjustments and modifications in the practices of assessment. This finding raises the need to inform students of their right to require adaptations and support. Sometimes, students prefer not to use adjustments because they want to prove to themselves or to others that they can succeed without external help. At the same time, this preference might reflect students' adaptation to teaching environments that are unreceptive to diverse student needs. The results of this systematic review further show that disclosing one's own dyslexia is sometimes costly in psychological terms and that many students may prefer to give up the opportunity to receive support to avoid embarrassment or stigmatization, especially when they have suffered these effects in previous school experiences. The implication is that HEIs should work to establish environments where the disclosure of dyslexia is welcomed. Likewise, adopting a cultural view of dyslexia not as a deficit, but as a neurological or cognitive diversity that has strengths and weaknesses similar to any other form of neurological or cognitive functioning (Griffin & Pollak, 2009), can be helpful. Finally, some students positively valued organizational practices in which the Disability Office informs all academic staff, sparing students from having to discuss their dyslexia with each teacher (7; 12; 14). This opportunity should be provided to those students who consider it appropriate.

Implications for Practice

Providing opportunities to identify one's own dyslexia

As far as the perspective of the students themselves is concerned, the identification of one's own dyslexia is an important step towards a more successful and comfortable experience in HE. People who have not been identified earlier should have the opportunity to discover and learn about their own dyslexia while attending HE. Although in HE it is primarily the students' responsibility to report their own disabilities or SpLDs (GAO, 2009), the available evidence shows that (1) students can navigate pre-university education without being aware of their own dyslexia and that this is associated with negative school experiences, and (2) if

academic staff members are aware of the possibility of dyslexia, they can advise students to be tested. This highlights the need to adopt strategies at the institutional level to inform academic staff that dyslexic students may be among the student body.

Staff training

Teachers' lack of dyslexia awareness can have a significant impact on students' learning experience. Our findings also show that rapport between students and tutors contributes to a positive learning experience, in which personalized advice and encouragement are also provided. The element of emotional and relational support is important to motivate students to overcome the obstacles and barriers that they encounter in their learning experiences. These findings further support the recommendation to raise academic staff's awareness of dyslexic students' needs.

Peer support

Emotional and relational support can be provided by both professional staff and peers (11). Some students claimed that they would benefit from meeting other students with dyslexia (14). Indeed, some guidelines for academic staff suggest that peer support should be encouraged (Lockley, nd). This type of support can be particularly useful in the initial phase, after receiving a diagnosis of dyslexia, which can destabilize students' self-image and generate feelings of shock. There is nevertheless a need to explore the impact of peer support initiatives in future research.

A flexible combination of universal design for learning and individualised support

There is evidence supporting the claim that UDL can respond to some of the challenges involved in teaching and accommodating students with dyslexia in inclusive settings. Nevertheless, HEIs should also provide individualized support and adjustments because learning needs vary among students and across different territories of their learning experience. Our findings show that not all students used adjustments, and students did not use adjustments in all courses. The available evidence suggests that academic staff should work at different levels to (1) design courses in flexible and multi-layered ways, for example by incorporating multiple formats of content-delivery to meet the needs of diverse students, and (2) provide individualized adjustments to students who display further difficulties and special needs (in collaboration with university disability services). This view is compatible with Norwich and Lewis' (2001) notion of continua of teaching approaches, implying that 'the various strategies and procedures which make up teaching can be considered in terms of whether they are used more or less in practice' (p. 325). Evidence from this systematic review indicates that students positively experience flexible course designs that offer the following: (1) opportunities to access contents in multiple formats; (2) use of media to enhance student control and self-pacing (as evidenced in studies focusing on the use of ICTs); and (3) additional forms of support to meet individual needs. Research is needed to ascertain how a multi-tiered, multi-faceted course design can be implemented in HE and how it might be received by students with and without dyslexia.

Directions for Future Research

The studies retrieved in this systematic review had descriptive designs and overwhelmingly explored students' own perspectives on the inclusion of people with dyslexia in HE. Future research should extend this evidence base by both exploring other people's perspectives regarding dyslexia and inclusion in HE (e.g., academic staff) and carrying out outcome evaluations of interventions designed to enhance the inclusion of students with dyslexia in HE.

Three studies (4; 5; 10) show how it is possible to design inclusive courses to simultaneously meet the learning needs of students with and without dyslexia; however, they mainly provide evidence of their impact on dyslexic students' experiences. More research is needed to compare how dyslexic and non-dyslexic students experience working together and utilizing the same learning tools and materials. This type of research is needed to further explore the feasibility and perceived effectiveness of the UDL approach.

APPENDIX

CRITICAL APPRAISAL TOOL

Adaptation of the tool published by the EPPI Centre (Nind et al., 2004), integrated with elements of the CEBMa (nd) appraisal tool and the Cochrane Qualitative Methods & Implementation Group chapter on the critical appraisal of qualitative studies (Hannes, 2011).

STUDY

Title

CRITICAL APPRAISAL

A. INTERNAL METHODOLOGICAL COHERENCE

	Notes
1. Did the study address a clearly focused question or issue?	Yes/no
2. Is the research method appropriate for answering the research question?	Yes/no/can't tell
3. Is the context clearly described?	Yes/no
4. Are the participants clearly described?	Yes/no
5. Is the sample design appropriate for the research focus?	Yes/no/can't tell
6. Are the data-collection procedures appropriate for the research focus?	Yes/no/can't tell
7. Are the procedures for data analysis reliable?	Yes/no/can't tell
Check for the use of quality control measures, for example member checks, peer debriefing, attention to negative cases, independent analysis of data by more than one researcher, verbatim quotes, persistent observation, recursive design or constant reviewing of emergent themes and accurate representation of participants' voices	
8. Is the research process traceable and clearly documented?	Yes/no
Check for the use of quality control measures, for example inclusion of sufficient data to assess credibility of conclusions,	

(Continues)

(Continued)

whether evidence can be inspected independently; reflexivity; peer review; audit; calculation of inter-rater agreement; and triangulation	
9. Inclusion of enough information on researchers' orientations/background?	Yes/no
Check for the use of quality control measures, for example attention to the effects of the researcher during all steps of the research process; reflexivity; and information on the researcher's background, education, perspective and school of thought	

Note: Questions 5, 6 and 7 bear on the credibility of findings. Questions 3 and 4 bear on the transferability of findings. Question 8 bears on the dependability of findings. Question 9 bears on the confirmability of findings.

Overall internal methodological coherence: high/medium/low

B. RELEVANCE of the study focus for the review question	Notes
10. Does the studies focus on aspects that are relevant for the inclusion of dyslexic students in HE? For example, teaching approaches, assessment approaches, support services, identification/diagnosis of dyslexia in HEIs, use of ATs and ICTs, peer support, and relationship/communication with academic staff	Yes/no
11. Does the study provide access to dyslexic students' views?	Yes/no

Overall relevance of the study focus for the review question: high/medium/low

SUMMARY OF STUDY QUALITY

		Relevance for the review question		
		High	Medium	Low
Internal methodological coherence	High Medium Low	High High-medium Medium	High-medium Medium Medium-low	Medium Medium-low Low

Additional notes

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